



FRIDAY, JULY 10.

CONTENTS.

ILLUSTRATIONS:	PAGE.	NEW PUBLICATIONS:	PAGE.
Siberian Railroad.....	476	Locomotive Building.....	486
The Coppel Warehouse—St. Louis, Mo.....	477	Bridge Building.....	486
Vauclain's Wrought-Iron Wheel Centres.....	478	Meetings and Announcements.....	487
Johnson's Electro-Mechanical Slot.....	478	Personal.....	487
High-Speed Rope-Driven Cranes.....	479	Elections and Appointments.....	487
Weed-Cutting Car.....	480	Railroad Construction.....	488
		General Railroad News.....	489
CONTRIBUTIONS:		Traffic.....	490
Too Conscientious.....	475		
Additional Facilities for the New York Elevated Roads.....	475	MISCELLANEOUS:	
How to Become an Engineer.....	475	Technical.....	484
The Basis of Railroad Rates.....	475	The Scrap Heap.....	485
		Railroad Law.....	486
EDITORIALS:		Rapid Transit in New York.....	475
Stiff Rails and Train Loads.....	482	Car Accountants' Convention.....	477
The Ravenna Accident.....	483	Iron and Steel in Colorado.....	479
		Shop Notes at Sacramento.....	479
EDITORIAL NOTES.....	482-483	American versus English Locomotives.....	480
		Production of Johnstown.....	481

Contributions.

Too Conscientious.

TO THE EDITOR OF THE RAILROAD GAZETTE:

That the manager of a single-track railroad, whose trains are run without the protection of any fixed signals whatever, should by any act of his deliberately add to the normally nervous condition of his passengers, would seem improbable, but it is nevertheless the fact that the writer, in a recent trip over such a road, was horrified at seeing painted in prominent letters on a stone abutment, "Prepare to meet thy God." I leave it to you what the ultimate effect of this conscientious but unwise policy on the part of the management must be on the revenues of this road and its future prosperity; and on behalf of its less reckless patrons I desire to enter my protest against the continuance of this policy, and demand that the objectionable notice be removed at once, or my asafetida block signal, which has already been fully described in your columns, be adopted.

C. W. BREWSTER.

Additional Facilities for the New York Elevated Roads.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your editorial of June 19, pleading for the employment of reason and common sense in considering the demand of the Manhattan road for additional facilities, is so moderate and discreet in tone that it may seem hardly gracious to criticize it in any way. It is, indeed, true that if the city will put up with a very little additional inconvenience in the way of new tracks and sidings, the Manhattan system can be made decidedly more efficient. But on the particular question of the Battery Park I am still unable to see why the city should accede to the specific demands of the road. As I understand it the road asks for more room at the South Ferry terminus, and thence northward to the point where the Sixth Avenue line diverges from the Ninth, in order that trains may be run more frequently from the latter point northward to Central Park and the northern terminus. But can this be done? The Sixth Avenue line is already crowded to its full capacity during the busy hours. This is accomplished by starting the northbound trains from Rector street, the first station north of the junction I have just mentioned. The addition of two, or a dozen, tracks south of Rector Street could add very little to the capacity of the line north of there unless the trains were lengthened, which I assume is not proposed. If, therefore, any advantage is to be gained by building new tracks south of the junction it must be by running more trains on the Ninth Avenue line. General Manager Hain has, however, said that it is impossible to induce people to ride on that line. It is so far from Broadway that they will put up with a good deal of inconvenience on the Sixth Avenue line rather than go the additional distance to Ninth. But again, suppose that by running express trains through to Harlem, or by some other inducement not yet tried, a share of the travel could be turned to the Ninth Avenue line. We still have the same method available that is in use on Sixth Avenue, to wit, start the trains from the first station north of the junction. The problem, therefore, simply resolves itself into this: Shall the city give the company permission to build a few additional tracks at Rector street, on the Ninth Avenue line, or shall it permit a further encroachment on Battery Park, which, whatever class of people may be actually using it at present, is certainly needed for a breathing space for the people at large.

S. G.

How to Become an Engineer.

LONDON, June 26, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Under this heading there have lately appeared in *The Engineer* several letters of the character which generally distinguishes this variety of correspondence on subjects really indeterminate. In the issue of June 19 a writer of quite a different style has arisen, who, in speaking of the prospects for engineers, says: "It would be better to look to some points for improvement in the various industries of the world or the transportation of the products of industry between the producer and the consumer. In the latter England offers a better field than in any other country in the world, as it costs her railways three or four times more to move a ton of freight than it costs on poorer roads in some of the other countries. And why? This is what engineers who have their fat offices with the railway companies do not care to know, and just the thing that engineers out of employment should find out in order to secure positions," etc. The writer uses the words "graduated," and the phrase "right here," in such a way as to prove himself an American, and finally signs himself. M. R. J.

Practically, his letter amounts to calling the engineers of English railways a pack of overpaid fools. This is all very well in its way, but is scarcely fair to one of M. R. J.'s countrymen, namely Mr. M. R. Jeffers, who is "fighting the battle of Yankee ingenuity here," and trying to sell to these same fat-officed fools a tubular frame truck or car to effect, as he believes, the very economy which M. R. J. appears to suggest. Is it fair to Mr. Jeffers that M. R. J. should jeopardize his countryman's success by the inconsiderate use of such a triplet of initials. To say the least, it will tend to throw a suspicion on Mr. Jeffers himself as the writer, though common sense tells us that of course no man would publicly dub his future customers as willful fools, and Mr. Jeffers will be bothered to deny the authorship of such an unfortunate epistle; for, assuming that railway men here think the time may have arrived for instituting a separate stamp of car for coal, lime and other rough mineral loads, it by no means follows that any one type of long car or under frame would be chosen, nor does it follow either that the bogie trucks would be necessarily of any one pattern. As M. R. J. says, we should not regard precedent, and it may be found that when the long car for freight traffic gets here it will be very different from that or those which act under the different conditions in America.

If I were Mr. M. R. Jeffers I should get some one to kick Mr. Anonymous M. R. J. round his office or my own.

A USER OF TUBES.

The Basis of Railroad Rates.

NEW YORK, July 8, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In reply to your editorial criticism of my article in your issue of the 3d inst. permit me to make the following statement:

The railroads are now under the supervision of commissions, which are required by the laws under which they act to see that the people are charged reasonable rates. These commissions are exceedingly aggressive and watchful, and may at any time claim that rates are unreasonable and bring the subject before the courts, where the onus of proving that they are reasonable will rest with the road or roads involved. The question, therefore, would come up on existing rates, which have been established after many years of experience, and after exhaustive efforts to stimulate traffic by lowering rates, have been made, and not on what might or might not be ascertained to be reasonable by future experiments. Conjecturing as to what might be is not for the consideration of the courts.

My article outlines a mode of procedure which a road may pursue in defending itself when it is charged by commissions with exacting unreasonable rates, or that a commission may use to prove its charges, if correct.

The principle involved is that persons shall not "be deprived of property without due process of law," whether it be through the aggression of railroads or of commissions. In other words the plaintiffs and defendants must come before the courts with their facts and figures arranged in the best manner possible to serve their respective interests. It is possible there may be a better mode formulated, but none occurs to me at present.

As to arranging rates for the future it is evident that commissioners must be governed by past results, but railroad companies may experiment at their risk with their own property. It is doubtful, however, in view of the great competition of the past between the railroads themselves, and with waterways, whether rates can be reduced further for the purpose of stimulating traffic without great danger of bankruptcy. It must be borne in mind also that the long-and-short haul provision in the national act causes reductions at many points where it is only desirable to lower at a specific point to foster traffic, thus rendering such experiments more dangerous. The fostering of manufacturing or mining interest can no longer as a rule be successfully carried on, because the necessary discriminations are now illegal.

S. Y. McNAIR.

New York Rapid Transit.

BY AN OCCASIONAL CORRESPONDENT.

Your editorial of June 12 is well timed, especially in what you say of the London electric line. Many people seem to have quite lost their heads over the City & South London line, as though it were filling the same place relative to London as must be filled in New York by the proposed rapid transit line. London and New York are to one another as the letters O and V. In London we all want to get to and from the centre of the O. In New York you all want to get to and from the point of the V.

The South London subway happens to lead along a radial line to the centre, which has been unoccupied or so badly occupied that the subway is the better route; but in no way does it rise higher than a tram line or a bus route in its nature. It is exceedingly convenient for a few, but it is a mere toy in size and equipment, and ought never to have been constructed. Its trains of three cars hold very few people and run at too long intervals, and everything which it teaches us respecting the possibilities of electric traction could as well have been taught us by a surface road without the waste of money in occupying a line of route and a city terminal point which should never have been granted to so ill-considered a scheme as this little circular pipe of 10 ft., which has already been practically admitted by even its promoters as too small to be repeated, for they have proposed larger extensions, the rolling stock of which could not pass the older tube.

London to-day proves the worst example of misapplied railroad construction that can well be imagined. Those roads which have any management about them stop outside, and those which get well into the centre have no management, spend their funds in fighting each other and give the worst possible service both in number and punctuality of trains.

As yet the whole question of electric traction is in embryo. Practical results show 12 to 20 miles per hour. Compare this with the Rocket locomotive, which ran at 36 miles per hour on the day the Manchester & Liverpool Railway was opened, the second public railway only, and see how much yet remains to be accomplished. Considering that steam is held to be inadmissible now in a tunnel, that no satisfactory air locomotive or system is known equal to the duty, nor any electric line yet built has got beyond the tramcar stage, men may well be excused for doubting the tunnel scheme. When electricians can shake off the fetters which seem to trammel their designs and set themselves to solve the problem in a manner worthy of mechanical engineers, we may look for better results; and to me their case seems full of hope.

Prof. Geo. Forbes, speaking as an electrician, you report as saying that the Southwark subway is perfect all round. Now, this is not the case, for the ventilating is not perfect, nor do I believe a chemical test would show a sufficiently low percentage of carbonic acid. The air is more or less charged at the staircases, and lift openings; but there is a good deal of churning and crossing over of the air at the intermediate stations from one tube to another. In the Mersey tunnel the air at stations is always fresh, for all fresh air enters at the stations, keeping them and their approaches fresh and sweet, and the foul air is drawn from the middle of the tunnel right under the river, through separate air drifts, by large colliery fans. Ventilation is not left to itself, nor should it be in even electric lines.

It is simply astonishing to see how a little bluffing on the part of subway promoters about trains being moving pistons and so forth is seemingly accepted by the public and even by opponents as the gospel of ventilation. These train-piston ventilators go no further than this, they don't endeavor to compel the foul air to go out nor to really and positively suck in fresh air by any arrangement of "beattee," to use a collier's phrase, nor do we hear of them calling on some practical colliery engineer, accustomed to stake lives against his plans, to consult or give a system. The colliery engineer has a work to do and he does it, but he doesn't stick a paltry air propeller with a small motor on its spindle into a dark corner or pack it away under a sidewalk. He puts down a fan 18 to 40 ft. diameter, and turns it by a handle with a steam engine on it and another ready to put on it as a stand-by, and the men who do this are the men to ventilate railroad tunnels.

Unless there can be a separate airway for receipt of air pushed before a piston train and provided with self-closing doors to prevent reflux, the piston idea may as well be abandoned, excepting only in short lines having no intermediate communication with the surface and not in communication at the terminals with the return track alongside. The piston system could be made efficient even on sectional lengths by suitable means, as indicated, namely, doors which should open and close before or behind a train and compel air currents to go a certain way; but failing this proper provision, it would be better to provide tunnel section sufficient to stop or reduce the piston action to a low figure, as it is only a hindrance to ventilation not specially schemed to utilize it.

The system proposed by Mr. Reno, whereby the foul air is allowed to escape by way of the stations is, wrong, as any one will admit who may stand in Professor Forbes, "perfectly ventilated" subway when a train is approach-



ing and pushing air from the tunnel into the station. It is doubtful, too, if the small fans proposed by Mr. Reno could accomplish what he expects from them. They will move a lot of air having a neutral space, but would likely move none against the opposing draught of a train. This provision of small fans I have noticed to be a favorite one with subway men. If they were so exceedingly efficient, should we find collieries fitted with the enormous and costly fans necessary for their ventilation, when a few small air propellers would give an equal output of air? I would rather trust to a chimney carried up 50 ft. above the ground and fitted with a reflux stop shutter than to a small, non-positive air propeller, and any rapid transit scheme which will prove efficient for a city so curiously located as New York will cost so much to construct that to neglect an efficient ventilation would be spoiling the ship for lack of a ha'porth of tar.

As regards dryness I suppose New York is far less suitable than London and the dryness of a London subway need not be looked for where geological conditions are very different. London is dry many feet down, in dense, stiff clay impermeable to water.

LONDON, June 28.

#### The Siberian Railroad.

Through Mr. O. W. Maddaus' translation of the report of Colonel Nicolai Woloshinow, of the general staff of the Russian armies, on the various projects for a trans-Siberian railroad, we are able to present the governing data on which the Russians are proposing to build their road that is likely to become so potent a factor in the world's progress.

By reference to the accompanying map it will be seen that the Russian railroad system ends at three different points toward the east, viz.: Orenbourg, the line to which was originally intended as part of a road crossing the Syr Darya, and occupying the route now covered by the eastern end of the trans-Caspian road; Slatouisk, a branch which will form a portion of the trans-Siberian road, and that there is in addition a road from Perm on the Kama, a branch of the Voiga, some 500 miles long, to Tomen on the Tura, an affluent of the Tobol River. These rivers with the Ob and Tom afford a continuous navigation, with from 3 to 5 ft. of water for about 1,400 miles, to Tomsk. At the other end of a route the Amur River and the Shilka, which are navigable for about six months in the year give a navigation of about 5 ft. up to Stretensk, 1,330 miles from Kabarovka, or 1,800 miles from the mouth of the river at Nicolaevsk, which, as it is in latitude 53 N, is not available as a winter port; nor is Vladivostok, which is 10 degrees further south, without danger of freezing in winter.

The Shilka, which, joining the Argun about 240 miles below Stretensk, forms the Amur, is said to be navigable for 60 miles above Stretensk to Nertschinsk, but the regular steamers do not run above Stretensk. The average time occupied by steamers is, from Nikolayevsk to Kabarovka, four days, and to Stretensk 14 days more. As the entire fall is but, 2,000 feet, this is due to a total absence of lights on the river and the habit of running only by daylight. The 1,460 miles from Tomsk to Tomen is made by steamers in nine days, though none of the rivers on the route are lighted.

The traveled route from Vladivostok to Kabarovka is 654 miles by land and water, of which only about 90 miles, in summer, is by land. The route is across the bay and up the Suifun River some 23 miles to go 12; from there there are some 90 miles of land travel to Lake Khanka, a shallow sheet of water some 60 miles long, which with the Suntschari and Ussuri Rivers is navigable to Kabarovka on the Amur. The Ussuri is a commodious stream for navigation, but the Suntschari is very crooked; 300 miles are passed to gain an advance of 100 miles. The railroad between Vladivostok and Kabarovka would be 520 miles long, and Colonel Woloshinow says that 260 miles out of Vladivostok would be sufficient to reach good navigation on the Ussuri.

The distance from Stretensk to Tomsk around the southern end of Lake Baikal is 1,900 miles, and by utilizing 60 miles of navigation on Lake Baikal nearly 190 miles of railroad can be saved. Irkutsk, the capital of eastern Siberia, is about 40 miles west from Lake Baikal. The distance from Slatouisk to Tomsk is 1,224 miles. In all the distances given the verst is taken as two-thirds of a mile.

Three different plans are favorably discussed by Colonel Woloshinow: One, an all-rail route from Slatouisk to Vladivostok, 4,994 miles long, with an estimated cost of 341,000,000 roubles, or say \$170,000,000; another from Tomsk to Stretensk, crossing Lake Baikal by steamboats, 1,712 miles, with 260 miles more railroad between Grafskaya, on the Ussuri River, to Vladivostok, or 1,972 miles of track, costing 122,000,000 roubles, or \$61,000,000; and a third project, following the same line, except continuing the road around the south end of Lake Baikal, extending the track down the Amur to Jernayeva, 480 miles, and building a road the entire distance from the Amur to Vladivostok, requiring 2,900 miles of track and costing 218,000,000 roubles, or \$109,000,000. The last two routes would be available through about six months of the year with the aid of steamboats.

The estimated time for passengers between Moscow and Vladivostok is by the first or all-rail line, 15 days and for freight 75 days; by the second line, passengers

40 days, freight 95 days; and by the third line, passengers 31, freight 79 days—that is, while the rivers are open. And it seems probable that it is not intended to give passengers by the rivers any greater dispatch than is given to freight. When the rivers are closed passengers would probably follow one or the other of the post roads from Orenbourg or Slatouisk east.

It is only for financial reasons that the two last mentioned routes, utilizing the waterways in part, are considered. Whatever may be the commercial advantages accruing from the construction of a road, and it is likely not only to open a large and valuable market for our productions but to make Moscow, instead of London, the distributing point for tea and Chinese and North Pacific products destined for European consumption, the road is essentially a strategic one. For the ability of Russia to defend and hold Vladivostok in case of war must depend entirely on the completion of this road before war commences. This idea is constantly present in Colonel Woloshinow's report. The building of the Moscow-Warsaw road for commercial profit instead of a line to Sebastopol is cited as an example to be shunned, and the assertion of Bakoreff that the receipts of this road did not amount to the millionth part of the irretrievable losses Russia suffered in 1855 is quoted in connection with predictions of the possibility of "closing a humble peace and losing our ruler of the East, Vladivostok."

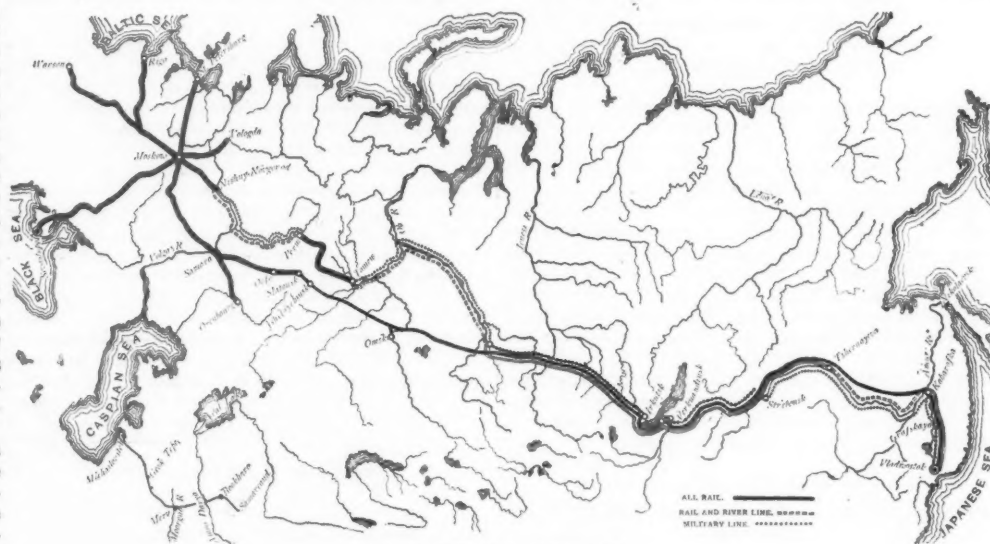
But in this case the interests of commerce coincide with the military requirements of Russia, and the only difficulty is the financial one. The project has been offered on the European bourses and has apparently met with no takers, as it is apparent that notwithstanding the isolated large towns, if not cities, on the

larly so as Russian resources in the way of steel and iron production are so limited that the greater portion of the rails and a good deal of the rolling stock would have to be bought from other countries. Her total production of pig iron is probably not greater than 700,000 tons, and unless special preparations have been made she cannot increase that output faster than at the rate of 10 or 15 per cent. until at least two years from now. When we commenced building our roads to the Pacific, which had their land grants on the condition that the rails should be of American make, our production of pig iron was in (1886) 1,205,663, and in 1870 it was only 1,065,179, or an increase of rather less than 40 per cent. for five years, showing how hard it is for a country poorly provided with railroads to meet any suddenly increased demand for iron. She can, however, supply all of the ties and labor.

The completion of this line before another war would probably insure the safety of the Russian province of Primorski, or the province "next to the sea," and an armed harbor on the Pacific. And by building a road from Orenbourg or Omsk to Samara and she would not only cheapen transportation over vast areas but would be in a very good position to acquire another harbor that would be open throughout the year—a harbor on the Indian Ocean. Any advance on the west until this is accomplished would be apt to be still more disastrous to her interests than the building of the Moscow-Warsaw line.

#### A Wholesale Store and a Freight-house Combined.

There has just been put into operation in St. Louis, Mo., an establishment designed to combine the advantages of wholesale storerooms with railroad freight-house and



THE SIBERIAN RAILROAD.

route, and the undoubted presence of vast mineral wealth, all of which, except the gold, is undeveloped, the road will not pay until it has had time to create a traffic through the economy in the cost of transportation which it will effect. Besides which, the present money centres of Europe are also trade centres, and they do not care to see their systems of distribution upset, as they would be by the new road.

It is now rumored that the Russian authorities propose to finance the road from the imperial treasury and complete it in 1895. This is a very considerable undertaking, requiring both energy and money. The Russians, however, are good railroad builders and their credit is appreciating. General Annenkoff has built 500 miles of road toward Samarcand in a year with the disadvantage of depending on the navigation of the Volga and the Caspian Sea for all of his material. But that was in a country where work could be prosecuted through the year. In Western Siberia, on the contrary, the winter is long and severe, with deep snows, and, though from east of Lake Baikal well down the Amur there is little snow, the ground freezes early and thaws late. So that it is doubtful if over 500 miles could be made a year under the most favorable circumstances, and, though ground is already broken at Slatouisk and Vladivostok, it is not probable that the 1,224 miles to Tomsk could be laid before the fall of 1893. There would then be 1,900 miles to Stretensk, and it does not seem that the navigation between Tomen and Tomsk is good enough to allow materials to lay over 900 miles east from Tomsk to be got forward by that time.

Working from the east toward the west there is a long ocean voyage to both Vladavostok and the mouth of the Amur, the latter available little more than four months of the year, so that it will probably be the end of 1892, under the most favorable circumstances, before the road is built through to the Amur, and it is doubtful if material could be delivered by the Amur at Stretensk so that any amount of track worth mentioning could be laid west of that point during 1893; but from that time on, 350 miles a year ought to be laid. Such an arrangement, if it worked, would allow all of the road except a piece along the Amur to be built by the end of 1895.

The cost of this undertaking is very serious; particu-

switching facilities to an extent, so far as we know, never before attempted.

The Terminal Railroad Association of St. Louis is composed of six of the larger of the lines centering in that city and in East St. Louis, and this Association operates the St. Louis Bridge, the Tunnel Railroad, the Union Depot, and a large system of terminals connecting all the lines on both sides of the Mississippi River.

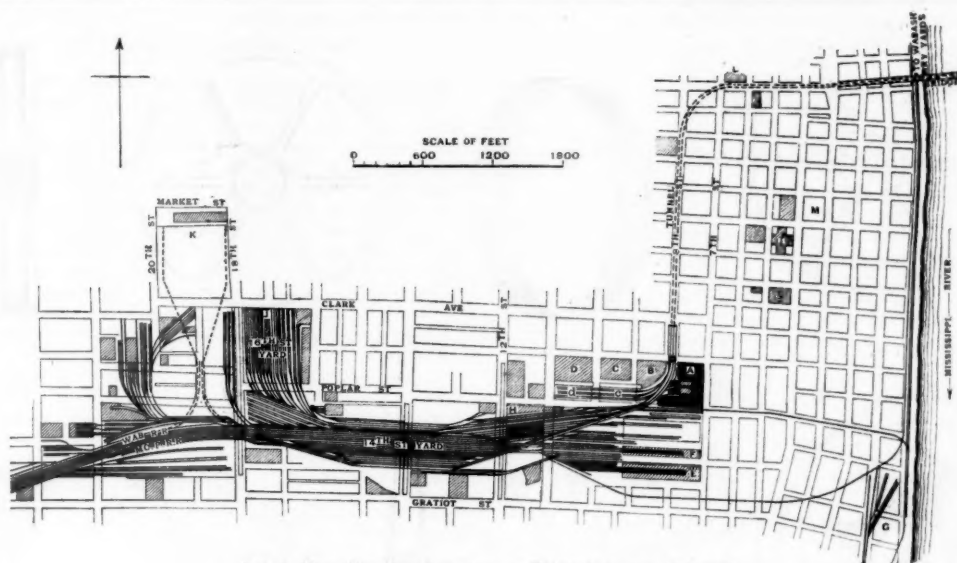
Upon either side of the tracks of this company, where they emerge from the tunnel, the Cupples Real Estate Co. has acquired a large piece of ground. Upon that to the east of the Terminal Co.'s tracks, covering a block approximately 400 ft. square, the Real Estate Co. has erected a mammoth brick building, or, rather, three buildings, containing 13 large stores seven stories in height, each furnished with two or more large steam elevators, and having a street delivery for city trade, and a rear delivery on platforms within the building to car doors upon the tracks of the Terminal Railroad Association, so that direct connection is had with every line in and out of St. Louis.

The finished structure, at present three buildings, faces upon Poplar, Seventh and Spruce streets. The tracks enter from Eighth street (which at this point is covered with the tracks of the Terminal Association), and are six in number, a seventh extending along the Poplar street side, and are so arranged that almost every store has its separate accommodation, and they will hold about 50 cars.

The plans herewith show the main, or track floor, to which there is a driveway from the south; but the main driveway enters from Spruce street, one story higher than the south side, passing along the west side of the building upon iron beams and girders over track No. 1, and between the north and south buildings over tracks 2, 3, 4 and 5; the entire interval between the walls being given up to team space. The interval, however, above the second story, between the north and south buildings, has been covered by five floors, carried by girders and posts, making practically one building of the structure, while the alley shown running north and south between the east and west buildings is spanned at each story by iron bridges.

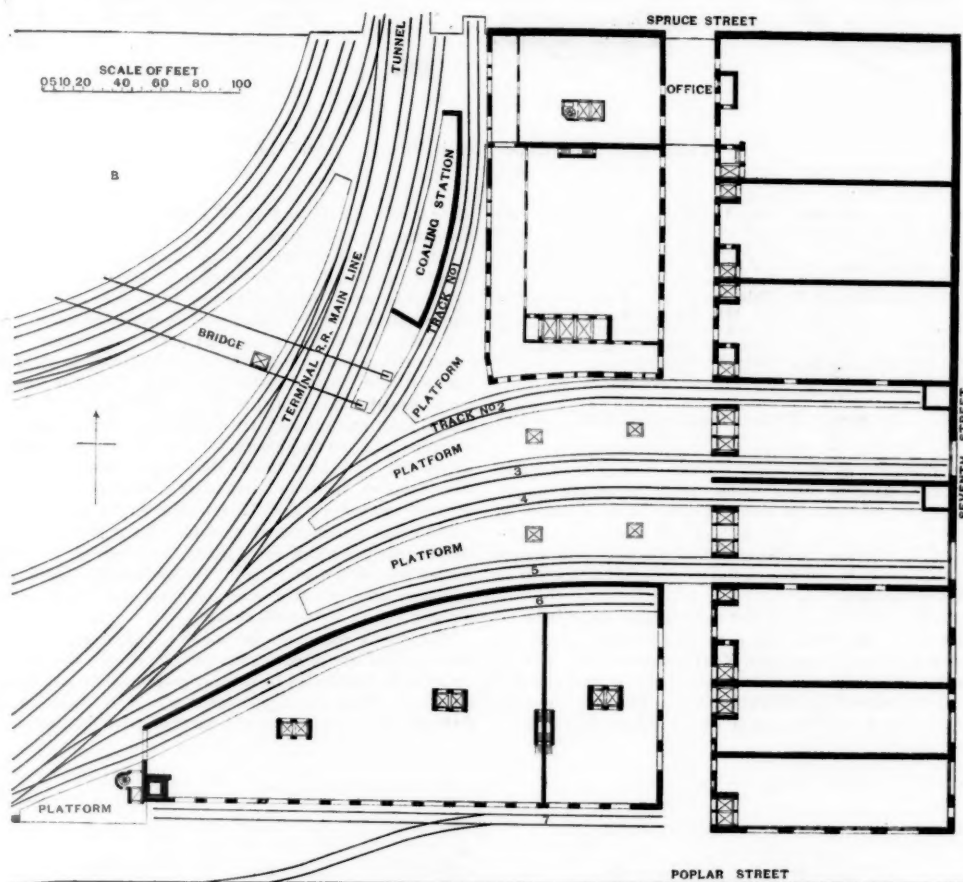
The building is fireproof, and the work is of the heaviest and most substantial character throughout. The





Sketch Map Showing Location as Related to the Railroads.

*A. Cupples warehouse; B. Cupples warehouse; C D. Cupples warehouse so n to be built; e d, trucks for C D; E. St. L. & S. F. R. freighthouse; F. St. Paul & Northern Pacific freighthouse; G. St. L. & S. freighthouse; H. Union passenger station; I. New union passenger station, soon to be built; L. Lindell Hotel; M. Merchants Exchange; N. Southern Hotel; T. Court House.*



THE CUPPLES WAREHOUSE, ST. LOUIS, MO.

steam plant, engines, dynamos, etc., are all in the cellar at the southwest corner, the coal being dropped through traps between the rails of track No. 6 and the north wall of that building, and the ashes hoisted out by special elevator on the outside.

The architects of the buildings are Eames & Young, of St. Louis. The elevators were put in by the Crane Elevator Co., and the dynamos by the Edison Co.

The contract of the Cupples Real Estate Co. provides that when the business done amounts to an average of 15 cars per day the Terminal Railroad Association shall constitute the building an agency, and bill freight therefrom the same as from any other station of the company. This has already been done, and cars are being delivered to and loaded from "Cupples' Station" just as they are to and from the company's warehouses, with full complement of clerks, etc., employed by the Terminal Railroad Association.

The location of this combination of wholesale groceries, woodenware and general jobbing warehouses, with a railroad depot which is practically the terminal of upward of twenty roads or "lines," is very favorable. It is within four or five blocks of the Southern Hotel and Courthouse, and but a block or two further from the business heart of the city. By this new departure the several large firms occupying "Cupples' Station" are still nearly as close to their city customers, whom they reach by teams, as before, while the year receive and re-forward by rail, without cost of drayage; the same

trucking in and out of store to the wagons, which has heretofore been necessary, being now sufficient to place the goods in cars ready for transit, saving both the cost of drayage and of the loading force which would have to be employed at terminal or loading stations by the railroads.

West of the tunnel tracks three large structures, each covering half a block or more, are to be erected, one of them (B) being already nearly finished. These will have a separate and complete system of tracks, and will be connected with the Cupples Station by a cantilever bridge spanning the tracks as shown on the plan.

### Car Accountants' Convention.

The sixteenth annual convention of the International Association of Car Accountants was held in Denver, June 16, President Horton in the chair. About 100 members were present. The following officers were elected for the ensuing year: President, E. M. Horton, Illinois Central; Vice-President, C. H. Ewings, New York Central & Hudson River; Secretary, S. P. Sechrist, *Official Railway Equipment Guide*; Treasurer, M. C. Trout, Toledo & Ohio Central; Executive Committee, A. Hale, Pennsylvania; C. J. Fellows, Cleveland, Cincinnati, Chicago & St. Louis; C. P. Chesebro, Wabash. The new constitution and by-laws, submitted by a committee on revision at the last meeting, were referred back to the committee for further consideration.

The first report was that of the committee on carding foreign cars, which recommended the adoption of a one-tack card,  $3 \times 2\frac{1}{2}$  in. In the discussion of this report a considerable variety of views was expressed. Mr. M. Sweeney (M. K. & T.) doubted the utility of carding cars at all. Half the cards are lost, and in all doubtful cases the yardmaster will say that the car did not bear a card. Foreign cars should not be moved without waybills, and the waybills should be copied and recorded. Mr. H. F. Parke (Mo. Pac.) thought that it would generally be very hard to get the transportation department to compel the use of waybills. Mr. Ewings (New York Central) uses a card which simply tells where the foreign car was received, but does not attempt to give directions for its return. Mr. Halsey (W. N. Y. & P.) had tried carding two years, and abandoned it because there had to be so many exceptions to the general rule. Mr. Hale (Pennsylvania) suggested that the committee should take up the question whether the agent at the interchange point or the car record office should look after the return of foreign cars, and whether cards or waybills, or both, should be used. A committee of five was appointed to consider the subject for the year.

The Committee on Per Diem recommended the use of straight per diem, and, to bring the subject before the meeting, moved that 30 cents per day be adopted as a proper rate. In the report of this committee an instance is cited of a certain road lending cars which made 52 miles per day, while during the same period the cars which it borrowed from other roads were run only 7 miles per day. Thus it paid  $5\frac{1}{2}$  cents per day for cars borrowed and collected 39 cents per day for cars lent. The discussion of this report brought out many instances of the complications that would come up if a per diem system for interchange were introduced. The Wiggins Ferry Co., of St. Louis, sometimes holds cars three or four days before transferring them across the river. The Grand Trunk, at the request of Western roads, gathers cars from its Eastern connections, and sends them west for grain and sometimes has to take them back empty because the grain does not appear as expected. The Southern Pacific sends cars east with oranges, and, collecting pay by mileage rates, gets \$1.50 per day for them, and thus would of course refuse to join in a per-diem rate system. It was stated that the New England roads are returning foreign cars more promptly since the abandonment of the clearing house association.

Mr. Hale gave some of the experience of the Pennsylvania under the old per-diem trial: "The Pennsylvania controls a large number of railroads whose accounts are kept separate, and when it was necessary to hold cars for the opening of the season upon one of the parts of the system, it became manifest that it was not fair to charge all of the per diem, and we found that we could arrange very simply to relieve that portion of the system of the per diem. If the car that was stored was a foreign car, and we stored it for lading, the system paid the per diem, and it was prorated among the system. If it was one of our own cars, the per diem was not paid at all. One of our P. R. R. cars could be held on the P. W. & B., for instance, and no per diem was charged at all. In the case of foreign cars which were held at the request of a foreign company, such request was not granted unless it was understood that the per diem should not be paid. Any system for per diem to work must contain a proviso of that kind."

Several papers were read which are withheld by the Publication Committee for revision.

### Vauclain's Wrought Iron Wheel Centres.

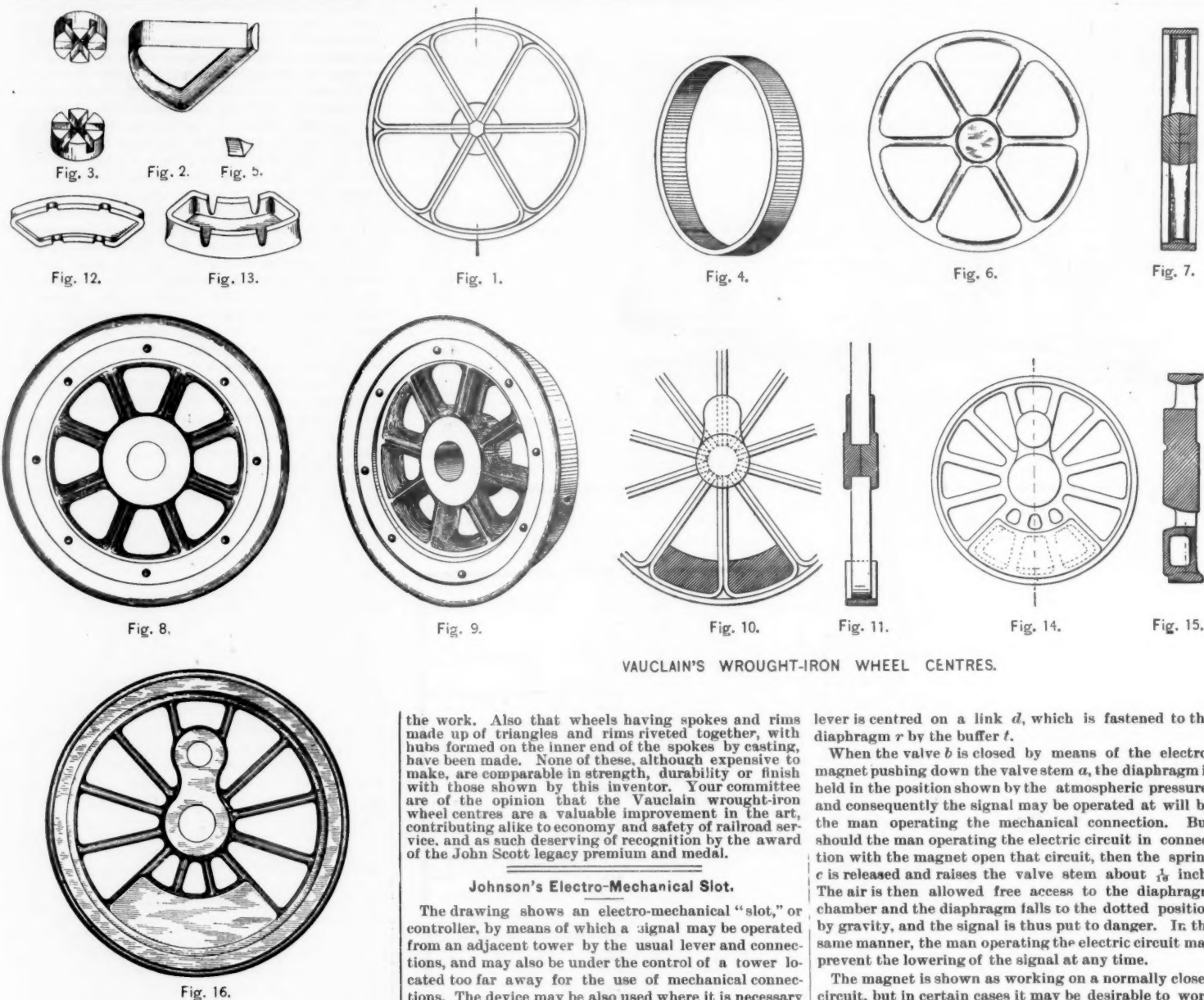
As we have before announced, the method of making wrought-iron wheel centres, now much used at the Baldwin Locomotive Works, and devised by Mr. S. M. Vauclain, Superintendent, has been made the subject of an examination and report by the Committee on Science and the Arts of the Franklin Institute. The sub committee consisted of Messrs. L. L. Cheney, Coleman Sellers, Jr., J. L. Gill, Jr., John Hall and S. Lloyd Wigand. They recommended the award of the John Scott legacy premium and medal. The committee's report, which was adopted May 6, is in part as follows:

The object of this invention is to produce strong wheel centres of wrought iron, expeditiously and cheaply, of the forms which theretofore had only been practicable to form by casting, and which had, as all iron castings have, a liability to fracture.

They are drop-forged or swaged from parts previously rough shaped, which are not only swaged or die-forged, but are simultaneously welded together. The parts are as follows: A cylindrical band, shown separately in fig. 4, which forms the rim of the wheel shown in fig. 1, a triangular bent piece, having a convex inner surface, the curved side forming part of the rim, and each straight side forming one-half of a spoke, shown in fig. 2, and hub pieces, shown in fig. 3, having radial grooves in which the inner ends of the spokes are placed. The parts are placed together, as shown in fig. 1, and small, triangular, drop-forged pieces, shown separately in fig. 5, are placed in the spaces left between the rim and the triangles.

The parts, as assembled, are placed in a furnace and heated to a welding temperature, and then placed in a bottom die, shaped like one-half of the finished wheel, on the anvil of a direct-acting steam hammer. The upper die, which is a counterpart of the upper side of the finished wheel, is attached to the ram of the steam hammer and guided so as to register with the lower die. It is then forced down upon the hot metal, and forces and welds the parts together, at the same time swaging them into the shape of the wheel, fig. 6, and of section as shown in fig. 7.

Any superfluous metal finds vent between the faces of



VAUCLAIN'S WROUGHT-IRON WHEEL CENTRES.

the dies in the form of a thin fin or beard which is easily removed with chisels. As above described, the wheel centre produced is a truck wheel having spokes of elliptic cross-section, shown with the tires applied in figs. 8 and 9.

For driving wheels, as at first made, bosses of metal, of the proper shape to form the crank, with grooves to fit over the spokes, were used, together with blocks of metal laid between the opposite spokes to form the counterbalance and corresponding recesses formed in the dies to shape them into the form shown in figs. 10 and 11. The weight of the counterbalance was thus determined at the time of the forging.

As further improved, the counterbalance is made hollow, of two parts, with notches in the edges to fit over the spokes, as shown in figs. 12 and 13, and the metal for the crank boss introduced in similar manner, and the wheel produced is as shown in figs. 14 and 15, with a hollow counterbalance, which is afterward adjusted in weight by the introduction of melted lead to suit the varying requirements of differing weights of connected parts in the engines, to which the wheels are applied. A finished driving wheel fitted with a tire is shown in fig. 16.

The dies for swaging the wheel are made with a flat bottom and rim, forming a bed into which the parts for the shaping of the spokes and rim are fitted in separate segments, the central boss and crank boss dies being of steel and the other parts of cast iron, so that by changing only a portion of a die, wheels of different proportions of hubs and length and diameter of crank may be made, a feature of great importance when the variety of sizes and proportions demanded for the numerous classes of engines is considered, in conjunction with the weight and cost of the dies.

The wheels as forged are soundly welded throughout, as is shown in the specimens submitted, cut in every part, so as to expose the parts involved in every weld. They have all the desirable features of shape and convenience of adjustment in counterbalancing that heretofore were procurable by cast wheel centres, and such strength as to be practically indestructible. In point of cost they compare with cast-iron wheel centres as the price of rough iron bars or muck bars compares with the best pig iron, the cost of heating, welding, drop-forging and dressing-off of fins being somewhat less than that of molding, casting and cleaning the iron castings.

Experience has demonstrated that sound and reliable welding is had with fins of less than one-fourth inch thick—more nearly one-eighth inch, in fact—and with a variation in weight of the wheels of less than two per centum.

Your committee are well aware that wrought-iron locomotive and car wheel centres have been made wherein segments of the rim were forged each with a spoke and segment of the hub and the several segments of the rim welded together. This was tedious and expensive work and required considerable dressing about the points of welding to make any presentable finish of

the work. Also that wheels having spokes and rims made up of triangles and rims riveted together, with hubs formed on the inner end of the spokes by casting, have been made. None of these, although expensive to make, are comparable in strength, durability or finish with those shown by this inventor. Your committee are of the opinion that the Vaucrain wrought-iron wheel centres are a valuable improvement in the art, contributing alike to economy and safety of railroad service, and as such deserving of recognition by the award of the John Scott legacy premium and medal.

#### Johnson's Electro-Mechanical Slot.

The drawing shows an electro-mechanical "slot," or controller, by means of which a signal may be operated from an adjacent tower by the usual lever and connections, and may also be under the control of a tower located too far away for the use of mechanical connections. The device may be also used where it is necessary for each train to put the signal to danger on passing an electric contact.

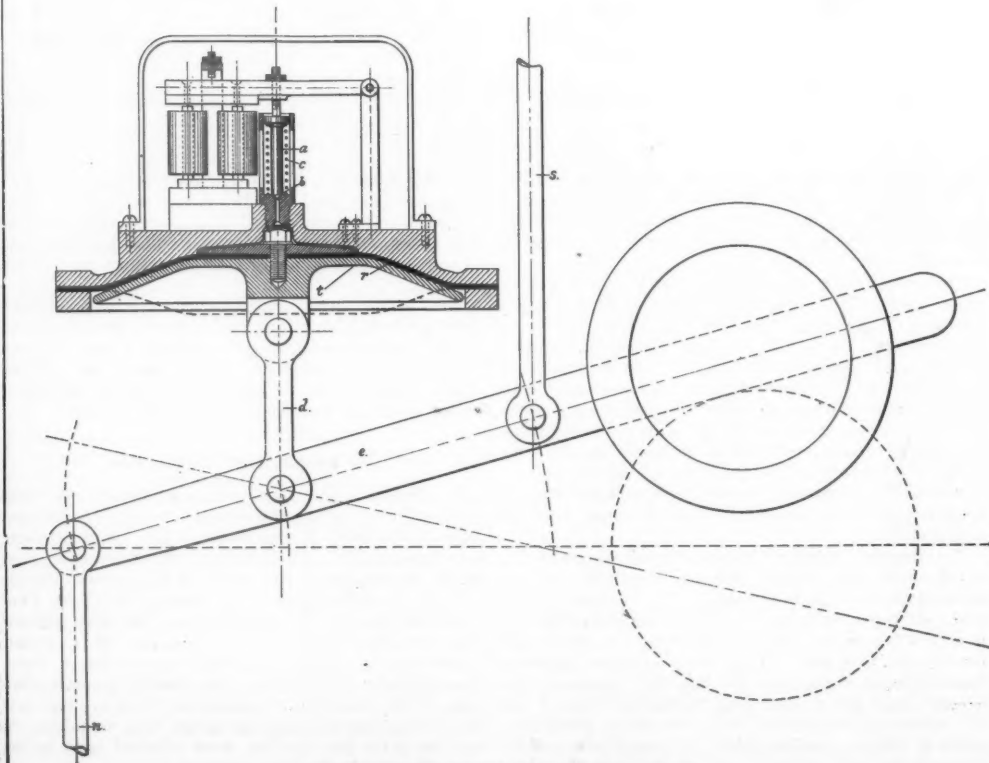
In the engraving *e* is the well-known balance lever, weighted so as to put the signal to danger in case of a rupture of the connections; *N* is the connection which extends to the adjacent tower, and *s* is the rod which is in direct connection with the signal. The cut shows the weight lifted and the signal at all clear. The balance

lever is centred on a link *d*, which is fastened to the diaphragm *r* by the buffer *t*.

When the valve *b* is closed by means of the electro-magnet pushing down the valve stem *a*, the diaphragm is held in the position shown by the atmospheric pressure, and consequently the signal may be operated at will by the man operating the mechanical connection. But should the man operating the electric circuit in connection with the magnet open that circuit, then the spring *c* is released and raises the valve stem about  $\frac{1}{4}$  inch. The air is then allowed free access to the diaphragm chamber and the diaphragm falls to the dotted position by gravity, and the signal is thus put to danger. In the same manner, the man operating the electric circuit may prevent the lowering of the signal at any time.

The magnet is shown as working on a normally closed circuit, but in certain cases it may be desirable to work with a normally open circuit. Instead of the diaphragm a piston and cylinder may be used, but there is less danger of leak with a diaphragm.

This device may also be used to control switches or switch and signal operating levers which are too far away to be controlled by mechanical connections. Steps have been taken by the inventor, Mr. A. H. Johnson, of Rahway, N. J., to protect this device by letters patent.



JOHNSON'S ELECTRO-MECHANICAL SLOT.



## High-Speed Rope-Driven Cranes.

The Philadelphia Engineering Works, of Philadelphia, are building high-speed rope driven cranes adapted to any width of span and any length of travel. Two ropes are made use of to insure reliability of operation, the allowed strain upon these ropes while at work being less than one-twentieth of the breaking strain. The speed of rope movement is from 3,000 to 3,500 ft. per minute. The ropes give motion to a shaft, from which power is distributed for the several necessary operations. For the power distribution, double belts are used, made wide to permit of a load of only 50 lbs. per inch of width while the crane is at its maximum rated capacity.

The accompanying illustrations show in fig. 1 a side

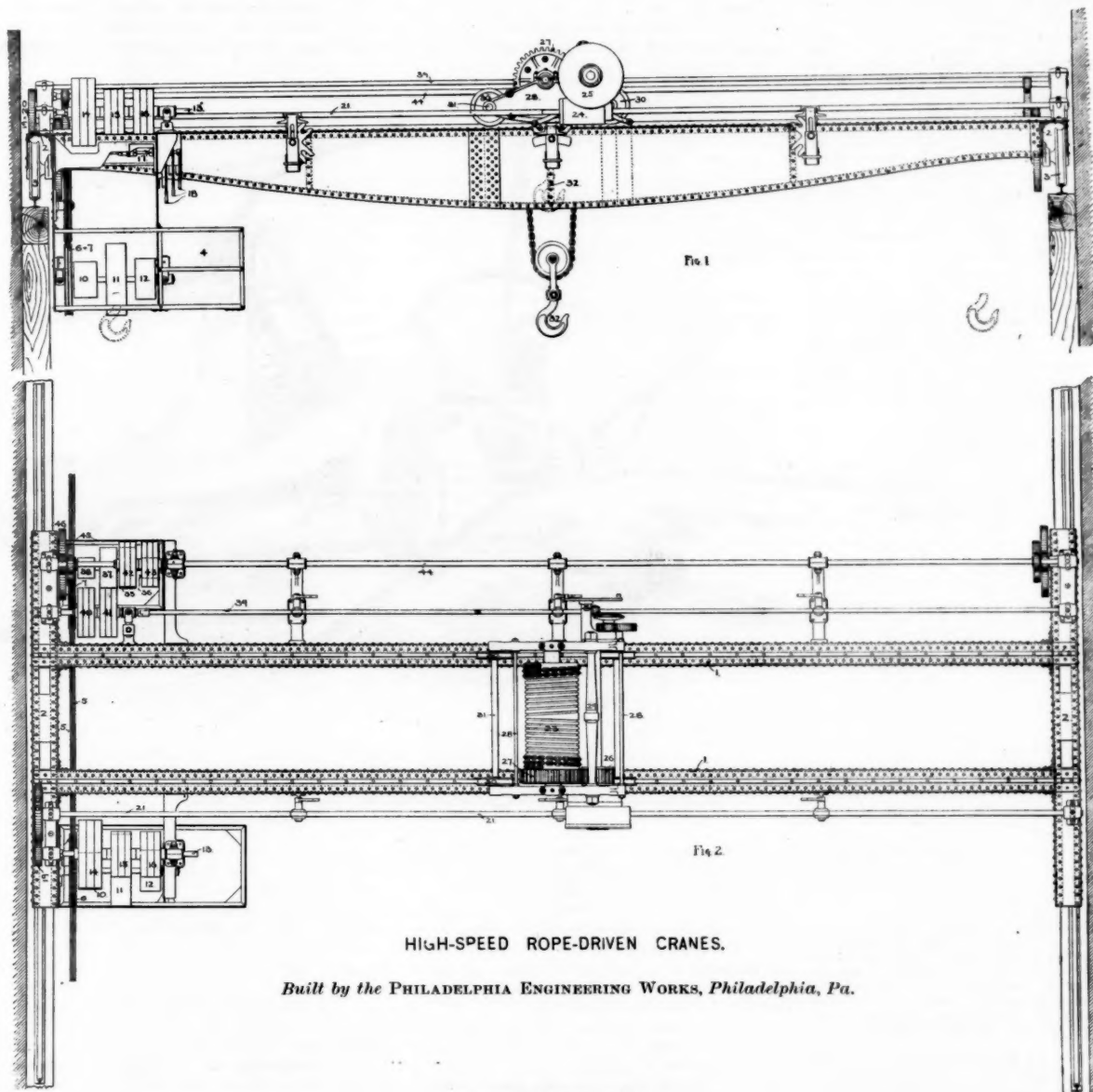
by means of tangent gears at 24 and 25 and spur gears at 26 and 27.

The trolley rides on steel cast wheels and carries a cast-iron drum provided with right- and left-hand chain grooves, to assure a constant centre hanging of the load and an equal division of the weight between the cross-girders.

Grooved driving sheave 7 operates a shaft carrying pulleys 35 and 36 for giving motion to the guides back and forth through the length of the shop, and pulleys 37 and 38 for giving motion to the trolley back and forth the length and span of the girders. The pulleys 35 and 36 are belted to two sets of tight and loose pulleys marked 42 and 43, operating upon a round shaft 44, extending the full length of the cross-girders. By means

## Iron and Steel in Colorado.

There has recently been started an undertaking in Colorado which may become important to that section of the country. The great coal seams on both sides of the divide, particularly in the central and southern portions of the state, have long attracted attention on account of their size and the quality of the product. The thickness of these veins ranges from a few inches up to 40 ft. and they grade from the lignites to a very good anthracite, the formation of these harder coals being due in cases to the action of heat rather than pressure. At places excellent coking coals are found, and the lines of ovens remind one of Pennsylvania, the quality of the coke made from coal in the Cardiff region being especially



HIGH-SPEED ROPE-DRIVEN CRANES.

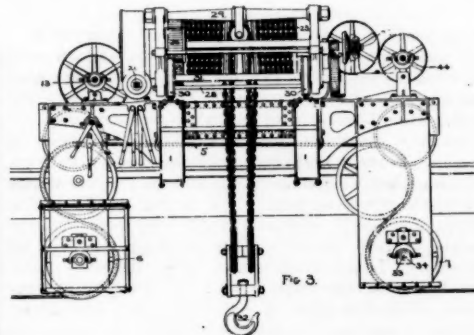
Built by the PHILADELPHIA ENGINEERING WORKS, Philadelphia, Pa.

elevation, in fig. 2 a plain view, and in fig. 3 a cross-section view of the crane as built. The cross girders, two in number, for carrying the load, are of box form, are made of plate, angle and channel iron, and are made strong enough to readily support a maximum moving load at their centre, without any appreciable deflection.

To the ends of each of the cross girders are fastened the trucks, having steel cast wheels, moving in oil-box bearings. A trolley of special design has an extreme traverse of the cross girders. The operating cage, shown at 4, carrying the pulleys, levers, etc., is securely attached at one of the cross-girders.

Power is applied through a pair of endless cotton ropes 5, which extend the whole length of the shop and full length of movement of crane, being controlled and guided by carrying pulleys set at regular intervals. The ropes are kept taut at one end by passing them over a heavy, strain sheave, moving in guidebars. This strain sheave and the reverse bend of the ropes at the grooved driving sheaves, marked 6 and 7, and their associates, provide for a reliable operating grip of the ropes.

Grooved driving sheave 6 operates a shaft carrying three pulleys, marked 10, 11 and 12. The power for lifting is transmitted from these pulleys by belts to an upper countershaft 13, fitted with three sets of tight and loose pulleys 14, 15 and 16, of varying sizes, whereby three speeds of lifting and lowering movement are provided for. From the countershaft 13, motion is transmitted by a pair of spur gears 19 and 20 to a square shaft 21, extending the whole length of cross girders and supported upon tumbling bearings. From square shaft 21 motion passes to the lifting drum of the trolley



of compounded gears 45 and 46 motion of two speeds is given by shaft 44 to move the guides back and forth. This method of transmission insures a parallel motion of the girders along the tracks. The pulleys 37 and 38 are belted to pulleys 40 and 41, acting upon square shaft 39, extending the full length of the cross girders. Motion and power is transmitted from square shaft 39 to the trolley by means of a combination of bevel and span gears adapted to give it motion of two speeds for trolley travel.

The cranes are built to lift and carry loads of 5, 10, 15, 20 to 30 tons and upward, to span any width of shop, and to carry one or more trolleys as may be desired.

The hoisting speeds range from 5 to 40 ft. per minute, depending upon the load and upon the size and capacity of crane used. The smaller cranes are provided with single drums and the larger with double drums,

good, comparing favorably with the Connellsville article. It is well known also that large deposits of iron ore, both hematite and magnetite, exist in various localities throughout the state and that good spiegel ore is to be had in places.

Several parties in Denver have been making investigations for some time past looking to establishing a steel plant, and have located claims at several points, of Bessemer ore, spiegel ore and coal suitable for coking, and have succeeded in obtaining valuable lands where the coal and ore lie close together. A company was recently formed to build and operate smelting furnaces, rolling mills, coke ovens, etc.

The capital stock of the company is five millions. The directory is composed of some of the most prominent and wealthy men in Denver. It is now contemplated to erect blast furnaces in the Gunnison country. The first stack will probably be in the region of Crested Butte.

An iron and steel plant will be erected at or near Denver, which will make merchant bar, plates, different angles and channels, and also rails.

## Shop Notes at Sacramento.

The editor of the *Locomotive Engineer* has made a visit to California and prints some interesting notes of his trip, from which we quote extracts as follows:

The Central Pacific road was for a long time isolated from other roads, and was made to depend upon the resources of the Pacific Coast for its supplies. It was then, and is now, a long and expensive haul from the East to California. For this reason the main shops of the old C. P., at Sacramento, are different from almost anything



else in the country. The buildings are large, rather old-fashioned, and comprise, besides the usual machine, car, blacksmith and other shops, a very large foundry and an extensive rolling mill. The company do not roll their own rails, but do make their fishplates, track bolts and all other forms of wrought iron. They cut their own nails, make their own spikes, mold their own car wheels and have built most of their own cars and locomotives. On all wrought-iron they save from one to two cents per pound over Eastern goods delivered. It costs \$1,000 freight to bring a locomotive from the East to the Pacific Coast, so that they have that much the advantage in building their own. There are in operation on this system locomotives of almost every build, but many of them were built in the Sacramento shops. Most of them are wood-burners.

There are no new engines being built now, the works being pretty busy when they keep up the repairs. They are building 500 new box cars of 60,000 lbs. capacity and 25 narrow-gauge cars. They are breaking up a whole series of 30,000-lb. cars that have reached the age for retirement, and will get rid of 30 or 40 old locomotives in the same way. Much of the fuel here comes from Australia and from Wales. Vessels coming for wheat bring it as ballast. The car and paint shops are always full. One shop here is devoted to Pullman-car repairs. There were 13 sleepers in the shop, the road having over 80 in its Pacific system assignment.

Mr. Small has recently rebuilt a lot of 17 x 24 engines, putting on new boilers the same size as those sent out by builders on 18 x 24 engines of the same class. These engines always have abundance of steam, have great adhesion, and are more economical than larger engines in the same service. In all the boilers built in these shops they flange the holes for washout plugs and tap the flange. This makes a strong job, and gives about an inch of good thread for the plug.

**Rigid vs. Swing Trucks.**—The question of the relative values of rigid or swing trucks for freight cars has so many advocates on each side that it is hard to come to a decision. Mr. Small took 10 cars, with rigid and ten with swing trucks, and took them to a crooked and hilly section of the road, and experimented with them, light and loaded, under every conceivable condition; and proved by the dynamometer that rigid trucks not only curved easier and wore their flanges least, but pulled easier than swing trucks. He proved that the main trouble with rigid trucks comes from neglect of the side bearings. Rigid trucks can be built for a third less than swing trucks. The repairs are much less, and the truck is far stronger and safer; but many railroad officers think they can't be used safely on crooked track. All new cars built here will have rigid trucks.

**Testing Wheels.**—To find the cause of so many broken wheels caused by heating, an elaborate machine was constructed for this purpose, that imposed upon a pair of wheels all the conditions of actual service, and provided means for weighing the loads applied, etc. Wheels made by 28 manufacturers have been tested to a failure in this machine, a careful record of load and time being kept for each. This test has been very carefully made, and extended over a long time. The result is that a form of wheel has been devised which is expected to excel all those heretofore tried.

**Air-Brake Attachment.**—All engines employed on heavy grades have the Sweeney air-brake attachment, which is simply a pipe from the steam chests to the air drum, with a suitable cock in it. It is used in case the air pump gives out or the pressure becomes reduced from repeated recharging of the auxiliaries. By reversing the engine the pistons become air pumps and the reservoir can be filled to the required pressure very quickly.

**Brakebeams from Old Rails.**—No good use had been found for old steel rail, and there was practically no market for it. Mr. Small recently conceived the idea of rolling the rail head out thin, leaving the bottom intact, and using the very strong rim thus formed for brakebeams. To test the matter, a few beams were made by drawing out the rail head under a hammer. The beams proved under test far stronger than necessary, light and very cheap. A form of brakehead has been made that goes on over the end of the beam, and a special forging forms the fulcrum.

#### Weed-Cutting Car.

The machine illustrated is a novelty manufactured by the Sheffield Velocipede Car Co., and has been put into actual use, giving good satisfaction. It is certainly an interesting novelty. It is the invention of a section foreman on one of the leading systems of road in the Northwest. He first tried it successfully on 50 miles of track, and then it was tried on some 200 miles on several roads before it was completed and offered for sale in its present form.

A special car is constructed, similar to the standard hand car, but larger and heavier, and geared up for the special work to be done. To the side of this car, opposite the brake, is attached a 6-ft. cutter bar. The sickle bar running in this is driven by positive motion from the axle, and is so arranged that it can be folded when passing bridges or other obstruction, and thrown out of gear when not in use. It can be adjusted to cut as low as the ends of the ties will permit, and to a point 8 ft. from the rail, or 6 ft. from the ends of the ties. From the peculiar construction of the cutting attachment it can be operated equally as well down the angle of a hill or up the side of a cutting as on level ground.

When the cutting season is over, this portion of the device can be removed and stored till another year, and there remains a substantial hand car.

The car is so geared that when cutting it can be run

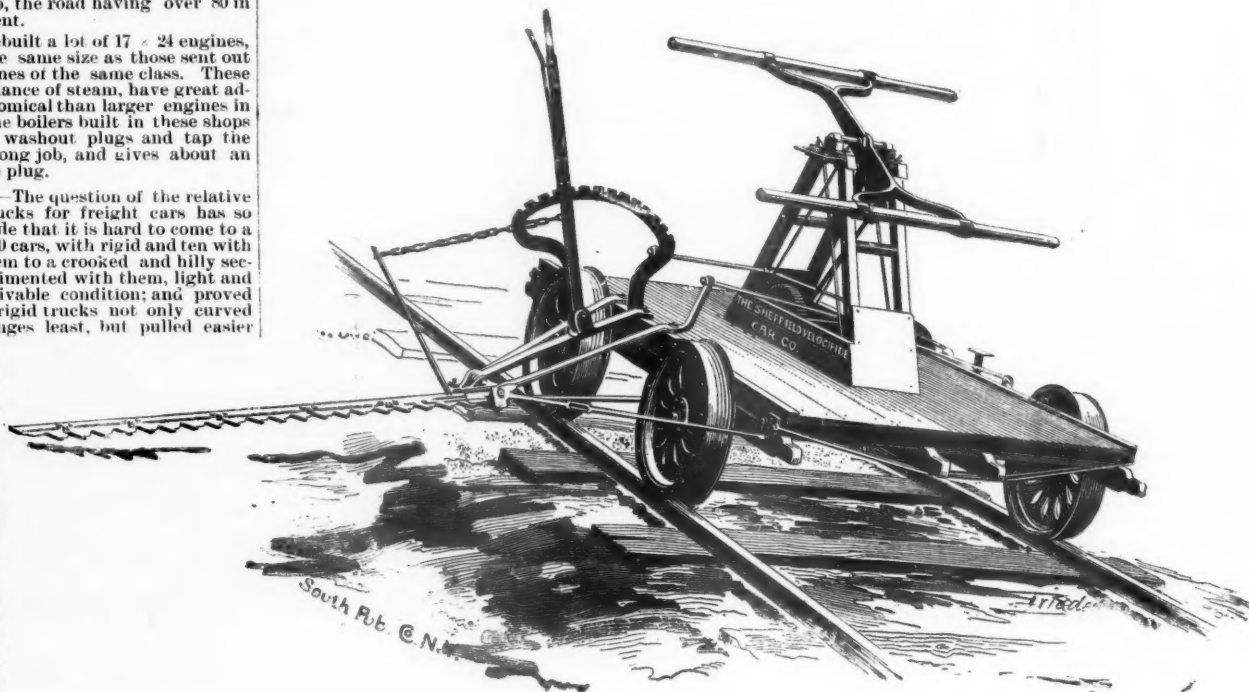
easily by four to six men at a speed of four to five miles an hour. It is intended that one shall be placed on a division of road of say 100 miles in length, and when the weedy season is on it should be transferred from one section to another, and thus in a few days the whole division be cut over, leaving the men leisure to devote their time to the track work proper until such time as the work needs to be repeated.

#### American versus English Locomotives.

BY F. W. DEAN,

In a recent number of *The Engineer*, London, there appeared a discussion of a report of mine on a series of tests made by me on the New York, Lake Erie & Western Railroad, of three locomotives, two belonging to that company and one to the Strong Locomotive Co. The editor of that journal calls upon me to account for what appear to English engineers anomalous facts brought

more economical than American is that the steam passages and cylinders are better protected from the weather than the corresponding parts of American locomotives. I fear the importance of such protection is not appreciated by our locomotive designers, for nearly every locomotive in this country has its steam passages formed on two sides by the outer walls of the cylinder castings, thus exposing them to cold air, rain and snow. I remember once seeing a small engine supplied with steam for a short time by an unclothed pipe which passed out of doors for some distance. Upon a hard shower coming up the speed of the engine was immediately reduced by about one quarter. Just so to some extent with all American locomotives when they are running in a rain or snow storm. So much heat is in this way given out to the atmosphere in this country that perhaps we shall have mild winters with an increase of traffic. It would certainly be a paying investment for any railroad company to lay out more money in patterns and core boxes



WEED-CUTTING CAR.

Built by the SHEFFIELD VELOCIPEDE CAR CO., Three Rivers, Mich.

out by that report. The time-honored controversy over the qualities of the locomotives of the two countries bids fair to be as old as Methuselah, and I fear that I can hardly satisfy the British mind upon the subject. Meanwhile American locomotives continue to displace those of English manufacture on colonial railroads, with considerable promise of driving them out altogether, as witness the recent large shipment to Australia by the Baldwin Locomotive Works.

There are doubtless many differences in the manner of working the traffic in the two countries, and I advise the editor of *The Engineer* to read the words of the Duke of Marlborough in the April number of *The Fortnightly Review*, which are: "It is not a flattering thing, perhaps, to our national pride, but if the truth is told our English railways are toy systems, and our rolling stock are toy freight carriers, compared to the trains that are run all over America." This was precisely my feeling when I first saw an English railway train.

Far be it from me to decry English locomotives. I recognize in them first-class designing, beauty in form and finish, superb workmanship, and an evident desire to excel in every respect, while in the design of the boilers we might certainly until very recently have learned valuable lessons. While speaking of boilers, let me call *The Engineer's* attention to Mr. Yarrow's recent vindication of American practice in using thin tube sheets which that paper has at least once condemned.

Often persons feel much relieved if they can give reasons for troublesome facts. There are several features of English locomotives which should make them more economical than American. First there are the copper fireboxes and staybolts and the brass tubes, which certainly do to some extent transmit heat to the water more perfectly than steel and iron. Mr. Yarrow, in the paper above referred to, gives the relative conductivity of copper and steel as six to one. How much this affects the actual performance I am unable to say, but what American locomotive builders must do is to contrive to get more of the heat of their fires into the water. If they cannot use copper fireboxes and staybolts and brass tubes, they can at least use the Serve ribbed tubes, which add some 90 per cent. to the heat-absorbing surface. There are the best of reasons to expect an increase of from 12 to 15 per cent. in evaporative rate by their use. Here is a great opportunity, with only a moderate increase in cost.

Another reason why an English locomotive must be

and have their steam passages surrounded by air space or protected by asbestos and sheet iron, and to make sure that no part of the cylinder castings, as is too often the case, appear above the cylinder casing.

There is nothing better established in steam engineering than that the greatest enemy of economy is condensation. Thirty-five or forty per cent. of the steam is condensed in the cylinders of locomotives. It condenses in the steam passages, and in the cylinders on account of the difference in temperature between the initial and exhausting steam. Persons who are not in the habit of considering this last cause of condensation regard it as incredible that heat can be absorbed by cylinder walls as rapidly as this implies when a piston is traveling fast. But one may as well doubt that an electric impulse will cross the ocean in all but no time, or that a conversation through a telephone over a distance of 100 miles can be carried on as rapidly as between persons in one room. Steam cannot move a piston until the latter's temperature is raised to that of the steam, and this heat is given up by the condensation of the steam. One may be helped to realize this if he considers how little he could push a red-hot mass of iron with an icicle, although this example is in the opposite sense of that which it is supposed to illustrate.

Coming now to the questions raised by *The Engineer*, I for one believe that the English locomotive is more economical in the use of steam and coal per horse power than the American, but I also believe that the American locomotive is the better paying machine, both from its lower first cost and the method of its employment, as clearly shown by Mr. Dorsey. This very method makes it extravagant in the use of fuel.

One cause of waste of coal by American locomotives is the severity with which they are forced when starting trains. Here locomotives are given all the steam that they will take without slipping the wheels. The English start off their trains more slowly. This view is supported by the statement of an accomplished English railroad engineer, in *Science*, some years ago, that the famous "Flying Dutchman" express train runs 28 miles out of London before getting up speed. An American locomotive would get up speed at least seven times in that distance. My own observation has been that three minutes is sufficient time to allow for an ordinary American train to slow down from 40 miles per hour to take on a flagman and then acquire a speed of 40 miles per hour again. More evidence of the ease with which Eng-



lish locomotives are worked is furnished by the large sizes of exhaust nozzles used, and by their not throwing many sparks, although the smokebox is generally free from netting and deflectors.

The *Engineer* takes as evidence of misrepresentation by Americans as to the amount of steam generated per square foot of grate per hour, the fact that none of the locomotives tested upon the Erie generated as much as 500 lbs. The editor should not suppose that engines having from 40 to 76 sq. ft. of grate would generate as much steam per unit thereof as one with 13 sq. ft., other things being equal. In *The Engineer* of Nov. 14, 1890, I gave the results of a number of tests of a locomotive which evaporated much more than 500 lbs. of water per sq. ft. of grate per hour, and within a month I have made a three weeks' test in which the evaporation was upward of 730 lbs. per sq. ft. every day, nor is this exceptional at all upon the road where the test was made. As bearing upon the severity with which our locomotives are worked, I append a table giving powers and speeds, etc., every two minutes of an Old Colony locomotive when pulling a Shore Line express train.

I thoroughly believe that the English method of burning coal in locomotives is superior to ours, but whether it would answer the purpose when working hard remains to be seen, although I am prepared to believe that it would.

The *Engineer* asks the question why the engines tested upon the Erie needed so much steam when pulling moderate trains at moderate speeds, and why such large locomotives are necessary for such service, and suggests that our passenger cars move with great resistance. As near as I can ascertain, the resistance of American passenger trains is 15 lbs. per ton at a speed of 40 miles per hour, while the resistance of English trains at the same speed is 17½ lbs. according to J. W. Barry and 17.3 lbs. according to D. K. Clark. This seems to dispose of the idea that our trains haul harder than the English.

The *Engineer* asks why a level line 140 miles long like the Susquehanna Division of the Erie is difficult to work. This remark of mine in the report referred particularly to the use of anthracite coal, although it is to some extent true of bituminous coal. The reason is that with anthracite coal the original fire burns out near the middle of the run, and leaves a very dirty bottom, thus making it difficult to maintain a good fire. Steam is kept up near the middle of the division only by having an enormous firebox with a most skillfully manipulated fire. The constant demand for steam makes it difficult to nurnor the fire, while on an undulating line this can be done on every down grade. The driver can get the water high on a down grade while he is losing little or no steam, and allow it gradually to fall as he ascends the next. This is a common and efficacious method of helping along. Besides this, he can run his engine slowly up and fast down grade.

TESTS OF LOCOMOTIVE NO. 145, OLD COLONY RAILROAD NOV. 6, 1889.

Diameter cylinders, 18 in.; stroke of pistons, 24 in.; diameter driving wheels, 5 ft. 9 in.

	Cards		Revs. per minute.	Piston speed, feet per minute.	Cut-off, inches of stroke.	Cylinder pressures.						Indicated horse-powers, total.
	No.	Time.				Boiler pressure.	Mean effective pressure, front.	Left effective, back.	Right effective, front.	Right effective, back.	Mean effective, back.	
Starting.....	2	10:3	108	432	15%	153 88.5	88.2	97.5	98.5	613		
	3	10:5	176	704	6%	156 51.7	52.0	52.5	55.7	568		
	4	1:7	216	864	4%	151 48.5	48.2	48.2	52.5	553		
	5	1:9	216	864	4%	153 29.7	29.8	30.5	30.7	303		
	6	1:11	230	920	4%	150 30.9	30.5	30.5	29.7	287		
	7	1:13	233	944	6%	143 12.7	13.5	13.5	14.6	632		
	8	1:15	244	976	6%	15 41.5	43.5	44.0	42.5	67		
	9	1:17	252	1,008	6%	143 35.0	36.5	37.5	35.5	555		
	10	1:19	272	1,088	6%	138 36.2	36.0	37.0	36.2	602		
	11	1:21	212	848	6%	148 38.5	43.2	42.7	42.0	537		
South bound..	12	1:23	196	784	6%	153 48.5	51.0	49.6	48.8	589		
	13	1:25	176	704	6%	155 51.5	53.2	52.2	53.5	564		
	14	1:27	168	672	6%	151 52.0	53.2	50.5	51.5	530		
	15	1:29	168	672	6%	153 53.0	54.2	52.2	53.1	546		
	16	1:31	222	880	6%	150 46.7	47.0	46.5	46.5	626		
	17	1:33	284	1,136	15%	147 22.1	21.5	23.7	22.5	388		
	18	1:37	240	960	6%	145 41.5	42.2	41.0	42.4	611		
	19	1:39	272	1,088	6%	149 38.7	41.2	37.0	39.5	518		
	20	1:41	244	976	6%	153 37.2	41.0	38.0	40.0	676		
	21	1:43	312	1,248	6%	147 37.5	35.2	33.5	34.7	609		
Starting.....	22	1:47	181	720	9%	149 72.2	73.0	70.6	72.2	783		
	23	1:49	232	928	6%	157 44.5	46.5	45.5	45.0	697		
	24	1:51	272	1,088	4%	154 24.7	25.0	24.0	25.7	416		
	25	1:53	221	896	6%	149 27.7	27.5	27.2	27.0	74		
	26	1:56	144	576	6%	148 47.2	47.2	47.2	48.0	416		
	27	1:58	221	896	6%	140 40.5	40.7	39.7	41.0	553		
	28	2:0	156	624	9%	159 65.2	66.7	69.0	69.0	641		
	29	3:1	216	864	6%	156 53.0	52.5	52.5	54.5	689		
	30	3:3	228	912	6%	155 45.0	50.7	50.2	52.7	693		
	31	3:5	192	768	9%	153 82.0	82.5	84.7	86.2	981		
Starting.....	32	3:43	240	960	6%	154 45.0	48.2	46.5	47.5	684		
	33	3:42	264	1,056	6%	157 42.8	42.2	40.0	42.0	671		
	34	3:44	280	1,120	6%	153 42.0	44.0	40.0	41.7	715		
	35	3:48	198	792	6%	151 31.5	31.5	31.5	35.0	401 (1)		
	36	3:50	232	928	6%	150 47.0	48.2	49.7	48.0	681		
	37	3:52	22	944	6%	155 45.2	46.5	45.0	45.0	653		
	38	3:54	288	1,152	6%	148 38.2	39.2	39.7	40.0	689		
	39	3:56	196	784	12%	147 36.2	38.5	35.2	37.5	440		
	40	3:58	164	656	12%	149 82.0	81.5	79.0	83.5	815		
	41	4:0	216	864	6%	146 43.5	45.0	43.5	45.5	584		
Starting.....	42	4:02	216	864	6%	152 46.7	50.0	46.7	50.0	643		
	43	4:04	221	880	6%	150 46.0	49.7	46.0	47.2	632		
	44	4:06	280	1,120	6%	150 39.7	44.5	39.7	44.0	716		
	45	4:08	324	1,296	4%	154 15.1	15.1	23.0	23.0	454 (1)		
	46	4:12	308	1,232	6%	151 15.1	15.1	30.0	30.0	738		
	47	4:14	320	1,280	4%	154 15.1	15.1	21.5	24.7	451		
	48	4:16	63	1,72	6%	151 15.1	15.1	36.2	37.5	430		
	49	4:18	220	1,120	6%	151 15.1	15.1	25.0	24.2	422		
	50	4:22	181	720	6%	145 25.0	25.0	22.0	23.2	266		
	51	4:24	208	832	6%	145 29.0	29.0	28.2	26.2	356		
	52	4:26	228	912	6%	142 23.0	23.0	20.5	22.7	310		

Average indicated horse power..... 577

To answer other questions put by *The Engineer*, large grates are sometimes (not often) used for bituminous coal in American locomotives, because it is a source of economy for large hard-worked locomotives. It is economical because the rate of combustion per unit of grate area is kept down to better limits, and the fire is not lifted so much by the draught. The fire is thus kept in better condition, and less coal is thrown out of the chimney. Moreover, a larger exhaust nozzle can be used.

Double nozzles are often used in this country, because some persons believe that they are better than single. One argument, supported in a measure by indicator diagrams, is that with single nozzles the exhaust from one cylinder passes over to the other and produces an increase of back pressure. This is of course a fact at slow speeds.

The weights of trains given in the Erie tables is a "mean" train, determined by a proper reduction of weights from trains of different weights over two parts of the road. Going east from Hornellsville to Susquehanna cars were dropped at Elmira, and going west they were taken on at that point. Elmira is 82 miles from Susquehanna and 58 miles from Hornellsville. Going west the train leaves Elmira late, as a rule, and time has to be made up. The large locomotives are needed to pull the heavier parts of the trains between Elmira and Hornellsville, and trains that are still heavier than those on which the tests were made. In the winter smaller locomotives would be all but useless against head winds, snowy tracks and increased journal friction.

The following tables give particulars of trains, exclusive of engine and tender, between Elmira and Hornellsville, 58 miles, three intermediate stops being made going east and two going west.

Now, if the editor of *The Engineer* will go to Euston, St. Pancras, King's Cross, Victoria and Paddington, and give us particulars of the express trains that he sees there, it will be instructive for comparison. In the absence of this information let us see what Mr. D. K. Clark says, in his recent work on "The Steam Engine," concerning the weights of trains which various express engines are intended to haul.

#### EAST-BOUND, SLIGHTLY DOWN GRADE.

Date.	Train.	Weight of cars and passengers.	Time.	Remarks.
Jan. 31.	6 Pullmans	380 tons.	98 minutes.	
Feb. 2.	1 Pullman	180 "	94 "	
6.	6 common	283 "	91 "	
8.	7 common	294 "	97 "	
17.	2 Pullmans	183 "	91 "	Sunday.
19.	4 Pullmans	338 "	90 "	
26.	2 Pullmans	168 "	96 "	One sect'n only.
28.	4 Pullmans	298 "	96 "	
Mar. 2.	3 Pullmans	312 "	101 "	
Apr. 19.	4 Pullmans	300 "	126 "	Delayed by an accident.

#### WEST-BOUND FROM ELMIRA TO HORNELLVILLE. TWO STOPS. SLIGHTLY UP GRADE.

Date.	Train.	Weight of cars.	Time.	Remarks.
Feb. 1.	1 Pullman, 6 common.	190 tons.	87 minutes.	
3.	1 Pullman, 5 common.	164 "	87 "	
7.	1 Pullman, 7 common.	212 "	85 "	Violent head wind with snow.
23.	4 Pullmans	220 "	101 "	
27.	2 Pullmans	220 "	92 "	
Mar. 1.	1 Pullman, 7 common.	214 "	97 "	
Feb. 16.	2 Pullmans	220 "	89 "	
18.	2 Pullmans	220 "	88 "	

#### Midland Railway.

Cylinders, 18 x 26 in. Coupled wheels, 6 ft. 9 in. Steam pressure, 145 lbs. per sq. in. Weight, 93,000 lbs. (Clark, p. 508). "The normal work of the engine is to take 14 or 15 carriages—a load of 150 tons (= 168 American)—up inclines of 1 in 100, at a speed of 35 miles per hour. The average time-table speeds of the train are from 35 to 42 miles per hour, over inclines varying from 1 in 100 to 1 in 124, and so on, of from 8 to 15 miles in length, and from 48 to 53 miles per hour over level lines and falling gradients. . . . From 7 lbs. to 8 lbs. of water is evaporated per pound of coal."

#### Midland Railway.

Cylinders, 18½ in. x 26 in. Single pair of drivers, 7½ ft. diameter. Steam pressure, 160 lbs. per sq. in. Weight, 96,000 lbs. (Clark, p. 535). "On the London & Nottingham traffic the average gross load is from 170 to 215 tons" . . . (i. e., from 102 to 147 tons of train = 114 to 165 American tons). "The time-table speed is 53½ miles per hour; the longest continuous run is 124 miles."

#### Great Northern Railway.

Cylinders, 18 in. x 28 in. Single pair drivers, 8 ft. 1 in. diameter. Steam pressure, 140 lbs. per sq. in. Weight, 96,000 lbs. (Clark, p. 264). "The 8-ft. wheel engines are capable of moving a gross weight, comprising engine, tender and train, of 356 tons on a level, at a speed of 45 miles per hour." This is equivalent to 348 American tons of train. Clark states, p. 555, that the average performance of seven such engines between Doncaster, Peterborough and London during the third quarter of 1884 was to haul a trainload of 175 American tons 50 to 53 miles per hour.

With the exception of the above train of 348 tons, which probably got up its speed very slowly, and apparently ran fast only on a level, all the trains mentioned are light.

A recent writer in *The Engineer* mentioned Midland trains weighing 180 tons, exclusive of engine and tender, running at a "booked" speed of 53 miles per hour.

On the whole it seems to me that the conclusions to be drawn are as follows: English trains are in general lighter than American trains. Trains on either side of the ocean are light when high speed is regularly made. American locomotives use more steam than English, principally because more is condensed in the passages, steam chests and cylinders. American locomotives evaporate less water than English per pound of coal, because the firing here is less carefully done than in England, and (to some unknown extent) because in England better conductors of heat are used in contact with the fire, and because there they understand the value and method of admitting the proper amount of air above the fire. American locomotives are larger than English, not only because they in general pull larger trains than English, but because they are designed to cope with very severe climatic conditions, with poorer tracks and with severer grades. The internal friction of American locomotives is probably greater than in English, because our wheels are smaller; this is especially true in cold weather, when the journal friction is greater. *The Engineer's* idea that our cars pull harder than those in England is not borne out by figures that are accessible to me.

#### The Protection of Johnstown.

The citizens of Johnstown, Pa., appear to have at last gone to work in a systematic and businesslike manner to avert the danger of inundation, which has cast a shadow over their prospects for two years past, since their great calamity of May 31, 1889.

At the meeting of June 19, at which the report of Mr. Croes, setting forth the sources of and remedies for their danger, was presented, Mr. A. J. Moxham, the president of the Johnson Company, made a vigorous address and offered the following resolutions, which were unanimously adopted:

*Resolved*, That an advisory committee of seven prominent citizens be appointed, whose duty it shall be to examine all plans for river improvement, lines of rivers, contracts and work done in connection therewith. Said committee to consist of the following parties, to wit: John Thomas, Fred Krebs, Charles Kress, Herman Baumer, E. Zang, Joseph Morgan, Jr., and Father Trautwine. Should vacancies occur in the proposed committee, such vacancies are to be filled from time to time by the Johnstown Board of Trade.

*Resolved*, That this meeting urgently requests Councils to immediately create the office of River Engineer and elect a thoroughly competent person to fill the same, whose duties shall be, under the supervision of the mayor, to take the complete charge of river improvements and the plans adopted by the Councils and the work connected with same, and to give his whole time to this problem and this only.

*Resolved*, That Councils be requested to make no further appropriation or contracts in connection with the river work until the river engineer, in conjunction with the advisory committee, present to Councils a complete and perfect plan of operations, together with reliable estimates of the probable cost, and to the end that no money be wasted the plan of operations to be submitted shall outline clearly with separate estimates the various points at which work shall be commenced first and the consecutive order in which the said work shall be prosecuted.

*Resolved*, That the advisory committee shall be requested to communicate with the various parties whose dams are reported to be in unsafe condition, with a view to having the structures rendered safe, and shall report to the Board of Trade the reply, which reply shall, if necessary, be acted upon by the Board of Trade.

Other resolutions provided for the financial management of the proposed work. The spirit of the meeting was fully in accord with the remarks and resolutions offered by Mr. Moxham, and he had the satisfaction of feeling, when he sailed for England a few days later for a three-months trip, that his earnest efforts of the past year had been successful in clearing up some at least of the difficulties in the way of the restoration of Johnstown and of putting in train a practicable movement toward the accomplishment of that result.

#### The Bethlehem Steam Hammer.

The Bethlehem Iron & Steel Company has just completed a new 125-ton steam hammer to be used in the manufacture of armor plates for government ironclads. The hammer is the largest ever built, not excepting that of Sneider & Co., of La Creusot, France, which has a 100-ton capacity. The Bethlehem hammer was designed by John Fritz, superintendent for the company. It is enclosed in a special plate manufacturing building in company with an armor plate rolling mill and a 6,000-ton plate bending press. The hammer stands some 60 ft. high and covers a floor surface 42 ft. square, and is of the usual A-frame construction. The steam cylinder is 6 ft. 6 in. in diameter, and has a stroke of 16 ft. 6 in. The total weight of piston, piston rod, ram and die sums up to 125 tons. The foundations for the hammer and anvil are independent of each other and the space between is filled in with crib work. The hammer foundations consist of a pair of heavy walls 30 ft. in height, laid parallel and north and south of the anvil foundation. These walls rest upon piles driven to rock bottom. Between the walls and upon piles closely driven to rock bottom is erected the anvil and its foundation. The foundation consists of a timber framework supporting several layers of iron and steel slabs arranged in longitudinal and transverse layers. The anvil is made up of 22 solid cast-iron blocks, averaging about 70 tons each in weight. The anvil block upon which the material is to be hammered is faced with steel, and measures 11 ft. in length, 6 ft. in width at bottom, 2 ft. in width at top, with a depth of 4 ft. 6 in. Associated with the hammer in its work are a pair of pneumatic cranes, capable of moving 300 tons each and of effecting all the various motions necessary to a steam hammer. The weight of plates, etc., to be handled, ranges between 20 and 100 tons in weight.





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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

It will be remembered that the use of the block system, interlocking signals and continuous brakes on passenger trains has been made compulsory in Great Britain on practically every mile of road used for passenger traffic. These safety appliances are already so nearly universal on the principal roads (except in Ireland), that we, at this distance, are likely to assume that no great hardship or even inconvenience will be imposed by this action of the government; but this general assumption is after all subject to numerous exceptions, and this fact is illustrated by a recent letter of Mr. T. C. Farrer to the *London Railway News* setting forth the dilemma of the Cambrian Railway, which is a system of comparatively new and rather poor lines in the mountains of Wales. This company's lines aggregate 236 miles, and the gross annual earnings are only about \$4,000 per mile, paying no dividends to the common stock. The directors have given notice that they must raise £40,000 (say \$200,000) on bonds in order to carry out the directions of the Government, and in the present straitened circumstances of the company this is a serious burden. The interest payments on this sum will postpone still farther into the dim future the payment of dividends to the stockholders. Mr. Farrer says that the road is conducted with as high a degree of safety to the passengers, employees and the public as are thousands of miles of road in western America, and that any money which this company may be able to borrow at reasonable rates ought to be used to construct a link of new road from Wrexham to Ellesmere, to make a much needed connection between its northern and southern lines. Mr. Farrer has the reputation of an impartial writer, but whatever his motives, there can be no question that his argument has a considerable basis in sound public policy. We do not know how much accuracy he can claim in saying that our Western roads have no more train-accidents than the poorer roads in Great Britain, but it is a fact that many of ours would have to go into bankruptcy if compelled to add much to their fixed charges; while, on the other hand, there are some that deserve to go into bankruptcy as a punishment for their recklessness, if we may judge from the collisions and other mishaps to trains, and the dangerous scrimping in maintenance of road, that are matters of common report. There is no doubt that a wise government interference would be salutary in the case of these and many others. Great Britain has acted on the assumption that all her railroads should be made first-class at once. Some of our states have been too content with third-class roads, and even roads which would have to be left unclassified. The Kansas commissioners recently threatened to annul the charter of a company whose track was notoriously bad. The Ohio

commissioner has had to order a certain road to run passenger trains at a very low rate of speed, 10 miles an hour, we believe.

But the important question is, How can we have wise state control? The English Board of Trade doubtless holds that the percentage of cases in which its orders involve hardship to the company is very small, that the forced expenditures will pay for themselves in time, and that the great variations in the length of time that the small roads and the large ones must wait for this return are unavoidable, and, moreover, that if real distress ensues it is the result of circumstances that could easily have been foreseen. If the law is oppressive in any respect the wrong is based on the assumption that trains must run as fast on minor roads as on trunk lines. It is true that if our pioneer companies had been compelled to build first-class roads they would have given up in discouragement, and civilization would have been deferred; but yet many of them have, in spite of their unguarded and unlighted switches and unwatched trestles, made a passable record for safety simply by not trying to accomplish impossibilities. They have not tried to run trains on cheap and imperfect roads at the speed of those on costly and perfect lines. Where there have been poor records resulting from accidents that could have been prevented by the present English law, an unreasonable desire for quick time has been at the bottom of the trouble; and restriction of speeds should be the main feature of the true remedy for the state to apply, either in England or here. Some of the railroad commissioners in the West have occasionally applied this remedy in their weak way (as above intimated), and probably to no effective purpose; but it is a method much more appropriate for public officers to carry out than are many of their other functions. Excessive speed results chiefly from too zealous competition and this is true in spirit even on roads out in the wilderness. Wherever roads compete in this respect, whether their tracks are parallel or approach a county seat from opposite directions and the racing is done simply to please rival country newspapers, they will bear regulating, in fact would welcome it in many cases. Whatever may be said about the functions of the state as regards private enterprises, it must be admitted that a race always needs an umpire, and that an umpireship is the least objectionable form of governmental interference.

And the Government would not need to dabble much in details. When a minimum time between termini, to be complied with without exception, with a larger minimum for ordinary use and a maximum rate of speed for all localities, have been prescribed and enforced, details will arrange themselves. As before intimated, the establishment of these standards by the roads themselves has maintained fair records on thousands of miles of American road which could not endure the high English standard. If the English Government can afford to make all its railroads first-class the people of the country are to be congratulated, but the poorer companies must inevitably suffer a temporary squeeze. There, as here, most of the companies see the profitableness of improving their roads, without being told. Here, as there, the state could perhaps jog the dilatory ones a little with benefit to all concerned; but there is no sense in setting up in business as an umpire unless the functions of such an office can be reasonably fulfilled. American states seem not to have learned this yet. Their citizens must first learn to put up with reasonable facilities. It is a great thing to have a railroad even if it can carry passengers at only 10 miles an hour, but the trouble here is that as soon as the rails are laid people want to ride at 40 if not 60 miles an hour. Perhaps that is the trouble with the Cambrian lines.

While the above is being written the Charleston (W. Va.) trestle disaster comes as an illustration that this question of speed is probably the most practicable point at which the relations between the public—the state—and the railroads concerning safety can at present be changed with any hope of improvement. The Charleston disaster occurred partly if not principally because trains were run at practically the same speed on a combustible trestle which was unwatched as upon solid ground. The lack of sufficient watchmen gives the key to the whole case. Possibly the company might have enhanced safety by using a better floor system with guard timbers, or have reduced liability to fire by more prompt renewal of unsound timbers; possibly on a road running more trains an equally dangerous bridge would have answered for years yet, as a freight train might have discovered the fire; but these are,

after all, minor questions. We must admit that the company cannot afford stone or iron bridges, and that it cannot constantly patrol its track; and this being so, the only safeguard is slow running. It is true that the poorest company can afford a velocipede hand car on every section, and that where there are few trains, as on the Kanawha & Michigan, a man with one of these light vehicles ought to inspect the track "before the first passenger train" (although that term sometimes does not mean much); and this company will doubtless at once see that its trackman goes over this section before 7:25 a. m., instead of after. But this does not settle the matter. Fires and other dangers are liable to occur in the face of evening trains as well as of those in the morning, and it is often necessary to run at night even when the business does not demand it regularly; so that if trains are to be run rapidly track inspectors must go over the road many times a day. This involves an expense of \$100 per mile a year, more or less, and that is an important item on a poor road. Again, the inspection of track by means of a velocipede car involves some little danger, as the inspectors are liable to get in the way of trains. Large roads depend to a considerable extent, for safety to passenger trains, upon the lookout kept by dozens of freight engineers constantly traversing the line. So that roads of thin traffic and thin pocket-books have no recourse but abstention from fast running. It is fortunate that, as we have already said, so many American railroad superintendents have the courage to enforce low speed rates. Where competition is sharp they are constantly tempted to disregard this element of safety, and the owners of the road, judging wholly by past records—which at best can often be made to show nothing more reassuring than that that particular road has killed a smaller percentage of passengers than the average—permit the operating officers to yield to the temptation. The public, which wants stone bridges, but cannot afford to pay for riding over them, should take the temptation out of the way.

#### Stiff Rails and Train Loads.

Some months ago we were told by an engineer, who is something of a specialist in track matters, that the Reading had been obliged to reduce freight-train loads since its 90-lb. rails were put in the track. The reason which he gave was that with the stiffer rail the area of contact between the rail and the driver is diminished, and the adhesion is so much less that the same engine cannot haul so heavy a load on the 90-lb. rail as on a more flexible rail. The story seemed so improbable that we made no inquiries about it until it was repeated with some circumstantiality. Now the General Superintendent of the road writes that "there is not a particle of truth in the statement." This is precisely what one would expect, for at least two reasons. The first and most important is that on the stiffer rail, other things being equal, the resistance will be less. The second is that the area of contact of the driver and rail probably varies but a trifle within permissible limits of deflection, and such variation as takes place probably makes no practical difference in the adhesion.

The latest important evidence in support of the first proposition was given by Mr. P. H. Dudley at the February meeting of the Institute of Electrical Engineers. In the discussion of a paper treating of the possibilities of very high train speeds, Mr. Dudley gave the results of some of his investigations of resistances due to the condition of the track. He has found that on the New York Central the resistance of the "Chicago limited" is materially less on the 80-lb. than on the 65-lb. rail. The difference is enough to make a saving of from "75 to 100 horse-power per mile." It is true that the 65-lb. rails were older than the 80-lb., and probably a part of the greater resistance was due to the fact that the surfaces of the rails were rougher and the joints in worse condition; but the vibrations set up in the train by the yielding of the rails will doubtless account for a large part of the increase of power required to haul it.

Probably no one, even without the evidence of Mr. Dudley's carefully recorded observations, will deny that so far as resistance to traction goes the rail should be absolutely smooth and unyielding. It should, in fact, be as perfect as a planer bed. The importance of this element is coming to be more and more recognized, and engineers every year give less weight to the old argument that the track should be elastic for easy riding, or for the diminution of the shocks to rolling stock or to the track itself. This tendency was very evident in the discussion of Mr. Clarke's paper on metallic track at the Lookout Mountain convention. Nearly every one who spoke said, in one way or another, that track must be made more rigid to meet the modern requirements of weight and speed. Therefore,



without stopping to discuss further Mr. Dudley's statement, we may pass to the second proposition.

How much is the area of contact increased by the deflection of the rail? and how much is the adhesion of the driver increased with a greater area of contact? These are two questions that no one can answer conclusively from pure theory, and that, so far as we know, no one has tried to answer by experiment. Certain well-known experiments have been made to ascertain the area of contact of the driver and rail. Those were made by Mr. O. Chanute, in 1874, on iron rails, and by Mr. D. J. Whittemore, in 1889, on steel rails, and although they have often been quoted we may repeat Mr. Whittemore's results here, as being modern practice. The area of contact was found in each case to be approximately an ellipse with the long axis across the rail. The figures are:

Diam. of driver, Inches.	Lbs. on driver.	Axis of figure, Inches.	Area, Sq. in.
70	16,000	$1.48 \times 1.0$	1.7
62	13,800	$1.27 \times 0.79$	0.86

These results are the means of a number of experiments. We are not told whether or not the rails were supported by ties directly under the drivers, but it is probable that this condition was ignored, and that it was a matter of chance where the ties were, relatively to the load. It is questionable if the area of contact would be appreciably increased by any admissible deflection of the rail. If one computes the radius of the curve of the rail when deflected under the weight of the driver, with track in good condition, he will find it to be several hundred times the radius of the driver. The two curves will coincide more nearly than when one radius is infinity, but the practical result will not be greatly different, for if the axis of the figure of contact lengthwise of the rail is increased, the transverse axis will be diminished. The surfaces of the rail and wheel will both be flattened until the area of this figure is 0.86 or 1.7 square inches, or whatever the load and the qualities of the metals may require, and then the contact will cease.

We see, therefore, that the area of contact between rail and driver is probably not increased with the flexibility of the rail; but supposing it were increased, would the adhesion be any greater? At first sight we should say yes, for it is now known to be a law of sliding friction that the coefficient of friction increases as the pressure per unit of area decreases—that is, with a fixed load, as the area increases. It is believed that this holds true also of friction of rest. So if we increase the area of contact, with a given load on drivers, we should increase the adhesion; but as we diminish the intensity of the load we diminish the abrasion and consequent interlocking of the particles of the metal. Therefore there may be a point where it is a disadvantage, so far as adhesion goes, to increase the area of contact. In short, the whole question is one thickly beset with complications.

Finally, while it is very doubtful if the adhesion is at all increased on a rail of considerable flexibility because of increase of area of contact, it is highly probable that it is diminished by another cause. We have said above that the train resistance is increased by the vibrations set up by deflection of the rail. The same cause would diminish the adhesion of the locomotive.

We may conclude that no one knows whether or not the adhesion will be less on a stiff rail, but that any such difference will be slight; while it is known that the train resistance is considerably less than on a more flexible rail. If the reader does not think all this is proved, let him try to prove that it is not proved.

#### The Ravenna Accident.

Since our last issue two dreadful railroad accidents have happened, causing the death of about 40 persons and the injury of 75 more. The first was before daylight on the morning of July 3 at Ravenna, O., on the New York, Pennsylvania & Ohio. A passenger train which was held beyond its time at the foot of a grade was run into by a fast freight train following down the grade. Such important particulars as we have been able to gather are given elsewhere. This one only we discuss here; the other we have noticed in another column.

A railroad accident is not often so simple that one can say just who is to blame or what would have prevented it; or, if he can indicate the remedy, it is not usually easy to say just how it should be applied. This one is as complicated as most of them. So far as we can judge it would have been prevented if one employé had done his customary routine duty. Nothing more was required of the man directly responsible than simple obedience to well-known rules. There was no sudden peril to paralyze his faculties; there was no unusual emergency to call for ingenuity or judgment. One employé, of subordinate grade, failed to perform a

perfectly simple act, the only act that he was expected to perform under the circumstances, and one which even a layman knows he ought to perform. That is, the rear brakeman or flagman ought to have gone back with a lantern and torpedoes to such a distance that the runner of the following train would have had sufficient warning. Apparently he only went back one or two car lengths. It may be decided that under the actual conditions of time, speed, grade, fog and rails he could not have gone back far enough to prevent a collision; but he could have given such warning that the speed of the following train would have been reduced and the effects of the collision mitigated; and it remains true that he ought to have gone back a reasonable distance.

From what we know of the spirit of the operating officers of the Erie system, and of the efforts that they are constantly making to instruct the trainmen in their duties under the standard code, we are not disposed to hold them responsible for this man's failure in discipline.

It may turn out that there was a more remote fault on the part of some one in not keeping the proper interval of time between these two trains. And that leads to the question of block signals. It may be said that block signals would have prevented this accident, and that the operating officers are responsible if they have failed to impress on the President and Directors the danger of trying to handle their business without block signals; or that the President and Directors are responsible because they have not had the line operated under the block system. Here, again, what we know of the investigations of the officers into this matter, and their attitude and policy toward it, makes us hesitate to say that they should be censured because block signals are not used. They have studied the subject carefully, and have serious doubts as to the practicability of handling their traffic under the block system on a single track without building more sidings than the road can afford to put in; for the Erie is still poor. Without a more thorough study of the problem than any outsider is likely to have made it seems hasty to say that they are wrong, and yet we incline to the opinion that they are. Unfortunately the accident of last Friday morning will cost the company enough to have remodeled a great many sidings and to have equipped and maintained a great many block stations, and now the expenditure for those purposes is put off still further; but still we should not like to say that the officers or directors of the company have not acted with sound judgment in deferring it heretofore.

The story was started by one reporter that the wrecked cars took fire from the lamps, and that has been repeated and made the subject of at least one burning editorial in a New York daily paper. No one who thinks twice will need to be told that this is a pure assumption. With a locomotive inside of a wrecked coach it is not necessary to look far for the origin of the fire.

There is still another particular in which the management of the road will be criticised. The refrigerator cars of which the freight train was composed were not air-braked, and from the evidence it appears that the train could have been stopped had the brake power been what it should have been and the lookout good. It will be said that trains should not be run at passenger train speeds unless they have enough air-braked cars to control them. In this particular also the policy of the present Erie management is enlightened and liberal. Their freight cars are being equipped with air brakes as fast as can be reasonably demanded, considering the financial condition of the company. It has been among the most progressive roads in this respect. Meanwhile it must run fast freight trains or abandon an important source of revenue. The Erie does not run its freight trains fast out of wantonness, but because competition forces it to. If it is to be restricted in this way its rivals must also be restricted. But there is one thing which one at least of its rivals has done that it could do. It could say to the refrigerator car men that if their cars are to be run on passenger schedules they must be equipped with air brakes.

Nothing has yet appeared to settle the questions raised by the terrible accident at Mönchenstein, Switzerland. The President of the railroad company says that the deaths number but 72, although it insisted by others that at least 120 were killed. The bridge was built by Eiffel and has been criticised in the past as being inadequate in strength and defective in material. The Engineer says that "the structure was a through bridge, with overhead bracing, T-shaped flanges, the Warren system of bracing in the webs, with vertical suspenders carrying intermediate cross girders. The parts of the web appear to have been very light. Professors Ritter and Tetmayer, the

engineering experts appointed by the Swiss Federal Council to investigate the causes of the fall of the bridge, have sent in the following provisional report:

"It will not be possible to express a definite opinion as to the primary causes of the catastrophe until after a careful test has been made of the materials used in the construction of the bridge, and exact statistical data have been compiled. In fact, whether it will be possible at all to state the actual cause of the disaster with certainty is at present doubtful. As far as our investigations have gone we are not in a position to attribute the accident either to any defect in the construction of the bridge or in the quality of the iron employed, nor have we yet established with any degree of certainty whether the train left the metals and thus caused the collapse of the bridge. The lie of the fallen girders and the position of the two locomotives may, indeed, permit one of the possible causes to be stated as probable, but it will only be possible to say whether our conjecture is correct when the portions of the bridge still under water have been raised and subjected to a searching scrutiny. We refrain, therefore, at present from entering upon the main question, and confine ourselves to setting forth our action in order that you may be assured that we shall spare no amount of research in order to discover a clue to the first cause of this regrettable accident."

An official inquiry into the safety of all Swiss bridges began on the 16th inst.

The *Archiv für Eisenbahnwesen*, which found serious fault with Foxwell and Farrer's book on "Express Trains, English and Foreign," has extended the investigation into the subject with true German "Gründlichkeit," so far as Continental trains are concerned, and gives tables showing not only the aggregate mileage and average speed of all trains classed as "fast" in each country, but of all such trains on each route in each country. Below is a summary of the facts collected by the *Archiv*, giving the daily mileage of these fast trains, the aggregate time in minutes consumed in making it, and the average speed per mile both in 1890 and 1888:

Railroads	1890.		1888.		Av. speed per hour.
	Miles run daily.	In minutes.	Miles run daily.	In minutes.	
Prussian State	34,902	64,673	27,576	53,453	32.4
North Germany	35,758	64,413	28,092	55,087	32.3
Holland	7,600	14,780	9,104	17,767	30.7
France	59,125	117,316	52,761	105,495	30.3
Belgium	8,090	16,127	6,778	13,705	29.7
Denmark	1,000	2,068	.....	.....	29.0
South Germany	19,508	40,000	.....	.....	28.8
Austria-Hungary	23,587	50,698	.....	.....	27.9
Italy	13,047	29,688	.....	.....	26.4
Rumania	1,473	3,422	.....	.....	25.8
Russia	16,008	41,498	.....	.....	23.2
Switzerland	6,320	16,829	.....	.....	24.5
Sweden	4,314	11,483	.....	.....	22.5
Norway	189	3,055	.....	.....	19.4

This table gives many trains which Foxwell and Farrer did not consider at all, not regarding them as "fast" trains, and in many countries trains are so classed which are only fast in comparison with the other passenger trains, which drag their slow length along. The *Archiv*, however, has calculated the proportion of the above named trains which run 30 miles an hour, or faster, and finds it to be 86.3 per cent. on the Prussian state railroads, 86 in Germany, 74.5 in Holland, 68.4 in France, 58 in South Germany, 44.2 in Austria-Hungary, 38.2 in Italy, and so on down to 2.3 per cent. in Switzerland. It shows that the number as well as the average speed of the fast trains on the Prussian State Railroads has been increasing for several years, the mileage of such trains having increased 11 per cent. from 1889 to 1890, nearly 20 per cent. since 1888, and 26 per cent. since 1887, the increase in miles of road having been less than 10 per cent. since 1887. The *Archiv* attempts only an imperfect statement of the English express service in 1890. The fast train of Germany *par excellence* is one running between Berlin and Hamburg, which makes the 180 miles in 3 hours and 44 minutes = 48.14 miles per hour, very nearly as fast as our fast trains between New York and Philadelphia, and exceeded by but few English trains. After all, however, it remains true that no country approaches England in the number of very fast trains (but the *Archiv* does not say this).

The British Board of Trade report on interlocking and block signaling for the calendar year of 1890 is just out. The percentage of double-track road (used for passenger traffic) that is operated on the absolute block system is 98½ in England and Wales, 100 in Scotland, and 35 in Ireland, making an average for the United Kingdom of 95 per cent. The increase from 1889 is only ½ per cent. The only roads showing a notable increase are the Manchester, Sheffield & Lincolnshire and the Manchester, South Junction & Altringham. The appendix, giving replies to the circular asking information about proposed work for 1891, which, in consequence of the recently enacted law, might be expected to be more than usually important, has very little of interest. Those roads which have the most to do to bring their practice up to the standard of the law evidently had not completed their plans when this report was made up. The Lincolnshire & Yorkshire reports that "two position blocks" have been substituted by "three position blocks" at a half dozen places named, and 16 sets of electrical apparatus to repeat the action of signal arms have been put in at various places; also 29 additional telephones in block-signaling cabins. The percentage of switches, grade crossings, etc., properly interlocked is 95 in England and Wales, 87 in Scotland and 65 in Ireland. Ireland has increased from 60 to 65 and the other countries slightly. The average for the United Kingdom is 92½ per cent.

The largest locomotive in Europe was completed last January at the works of J. A. Maffei, in Munich, for the



St. Gotthard Railroad. It is a four-cylinder compound engine of the Mallet type, with 12 driving wheels, forming two "bogies" of six drivers each. Though the total length of engine from buffer to buffer is 14 metres = 45 ft. 11 in., the wheel base of each "bogy" is but 8 ft. 10 in., the total wheel base of the engine being 8.5 metres (= 27 ft. 11 in.). The boiler has 1,600 sq. ft. of heating surface, and 23½ sq. ft. of grate surface. With 13 tons of water and coal the engine weighs 92½ tons, or 15,400 lbs. on each driving wheel. It was calculated to haul 220 tons gross up grades of 132 ft. per mile, coinciding with a curve of 180 metres (= 590 ft.) radius, or about 2,200 tons on a level tangent.

The winter wheat has begun to move to market and many cars that have been standing idle are starting out on their annual cruise for cargo. All the spring we have heard of hard times for the roads and of dull trade for the car builders and supply men. Soon we shall hear that there are not cars enough to move the crops. But we are not prepared to-day to suggest any remedy for these fluctuations. We only suggest that quarrels be put over till the next dull season, and that all hands pitch in to get traffic and keep up rates and make hay while the sun shines. If they cannot get traffic and keep up rates, supposing they try the experiment of carrying a smaller tonnage at a higher price.

As an immediate result of the Norwood Junction bridge failure, the London, Brighton & South Coast will at once substitute for its numerous cast-iron bridges others of more modern design and material. Cable dispatches say that 80 bridges will be rebuilt on that line. Doubtless these are all bridges of very short span. Sir John Fowler is reported as having said that the other English railroads are as badly off in this particular as the Brighton.

#### NEW PUBLICATIONS.

*A New Basis for Chemistry: A Chemical Philosophy.* By Thomas Sterry Hunt, M. A., LL. D. Third edition, with new preface. New York: Scientific Publishing Co. 1891. Octavo. Pages 248. Index. Price \$2.

The earlier editions of this treatise have worked their way slowly among a group of the more advanced chemists, but have not yet greatly influenced the scientific world, perhaps for the reason that the views set forth involve a radical change in the system which for so many years has served for the interpretation of chemical phenomena, a change for which few men see an adequate reason. In fact the "new basis" cannot be regarded as fully established. Certain facts at variance with the old theories have been proved, but the new data are not complete enough to be reduced to working formulae which shall supersede those framed in accordance with the atomic hypothesis. Dr. Hunt indeed makes no claim to having done more than outline the direction in which future experimenters and generalizers should seek for laws explanatory of chemical action and reaction. In doing this he has made one of the most suggestive volumes in the whole range of recent scientific literature, and as a guide to those wishing to follow further a line of similar study and research it possesses the unusual feature of an exhaustive historical review of all books and fragmentary essays which mark important advances in chemical knowledge within the last 50 years, with foot-note references to titles and places of publication.

The keynote of the work is found in the discussion of the chemical process, where it is said that the chemical history of bodies is a record of two classes of changes—first, *metagenesis*, where by condensation and union two or more species (elementary or compound) merge their specific characters in those of a new species, or by expansion and division a body breaks up into two or more new species; and, second, *metamorphosis*, which embraces the phenomena of polymerism, where we have changes of state by condensation and by expansion without involving specific difference. By a consideration of these changes Dr. Hunt arrives at the conclusion that "the notion of pre-existing elements, or groups of elements, should find no place in the theory of chemistry. Of the relation which subsists between the higher species and those derived from them, we can only assert the possibility, and, under proper conditions, the certainty of producing the one from the other." The type of the chemical process he finds in the phenomenon of solution, "from which it is possible under changed physical conditions to regenerate the original species." It is interesting to observe his substantiation of the teaching of Kant that chemical union is an interpenetration of masses, and not a juxtaposition of molecules as conceived by the atomistic chemists. He considers, however, that Hegel's definition is more adequate—"the chemical process is an identification of the different and a differentiation of the identical," which he explains to be borne out by the integration, or unifying, of unlike species in the process of metagenesis, and by the simple transformations of chemical metamorphosis.

A significant question is further propounded by the author, and the probability of a solution to the problem involved made strong by definite answers in several individual cases, which will have a most important value in the chemistry of the future. He asks "whether a definite and constant relation may not be discovered between its vapor-density and the specific gravity of a

species in its solid state; what equivalent corresponds to a given specific gravity in any crystalline solid; in other words, what is the value of the condensation which takes place in the change from the gaseous to the solid state?" Determination of these values would enable the equivalents of solids, like those of gases, to be determined from their specific gravities—the latter referring to the common standard of hydrogen as a unit.

Enough has been given to show the very remarkable character of this volume, which constitutes virtually a *résumé* of Dr. Hunt's work on Chemical Theory. He has distinguished himself as one of the most original of the scientific investigators and thinkers of America, and his opinions thus set forth, toward what is probably the end of his life's work, are not to be lightly regarded. He is no vain theorist, but a close reasoner upon known facts, with the additional characteristic that he is not afraid of the conclusions to which his premises lead him, although they force him at times to startling deviations from the beaten paths. If any criticism were to be made it would be the expression of regret that he should have suffered himself at any point to be restricted by a feeling of conservatism. It is also a little singular that he should insist so strongly upon an inherent difference between chemical and physical forces, when the signs, even as brightened by some of his own investigations, point to a unity in the nature of force of whatever variety of manifestation.

*Compressed Air Production.*—By William L. Saunders. New York: Engineering News Publishing Co., 1891. Pamphlet. Price, 50 cents.

This pamphlet of 32 pages is a lecture delivered at Sibley College, Cornell University. It contains rules and tables relating to the theory and practice of air compression and compressed-air machinery, with some comparison of practice in Europe and America. The author has endeavored to treat the subject from the standpoint of experience, and certainly his opportunity for gathering valuable experience has been large, and so far as we can judge from this pamphlet it has not been wasted. The pamphlet is a useful addition to the somewhat meager literature on the subject.

#### The Ravenna and Charleston Disasters.

The worst disaster that ever occurred on the New York, Pennsylvania & Ohio happened at Ravenna, O., on the morning of July 3, at about 2½ o'clock. It was a rear collision, and 21 passengers were killed and 12 badly injured. Fifteen others were somewhat hurt. Passenger train No. 8, eastbound, was detained at the station from three to six minutes, and while standing there was struck by a heavy freight train, consisting chiefly of 24 loaded refrigerator cars, which approached on a descending grade from the west at considerable speed, probably 20 miles an hour or faster. The rear car of the passenger train was a common day car filled with glass-workers bound from Tiffin, O., to Corning, N. Y., and 19 of these men were killed. The engine buried itself in the car, and three or four men were crowded into the smokebox, where they were slowly roasted to death. The second car from the rear was an empty sleeping-car. The third was one of the regular sleepers, and, with the other two, was badly wrecked. In this a baby and its nurse were killed. The wreck immediately took fire, and nearly all of the killed were very badly burned, most of them so as to be unrecognizable. The Ravenna fire department was called, but the flames were not extinguished for about an hour, and by that time the combustible portion of the wreck was burned up. The Associated Press dispatches stated that the cars took fire from the oil lamps. This cannot now be verified, but several gallons of kerosene oil in the lamps in each car would furnish excellent fuel whether or not the fire originated with them. The whole of the train except the two rear cars was vestibuled, and suffered no appreciable injury. It proceeded on its way, a short time after the collision, with all but the three wrecked cars.

The freight train left the yard at Kent four minutes behind No. 8. This is what the record shows; but the freight started from a side track a mile east of the station, so that the actual interval between the trains, after the freight men had set up the switch and got started is difficult to determine. The rear brakeman of the passenger train, who has seen 10 years' service on the road, seems from all accounts to have gone back only a short distance.

From the *Cleveland Leader's* excellent report of the first day's hearing before the Coroner we summarize the following: Passenger train left Kent at 2:13 by trainmen's testimony, 2:11 by operator's record; arrived at Ravenna 2:27 or 2:30, the latter being the testimony of F. D. Boynton, the rear brakeman. Engineman Pendergast had found the whistle inoperative at the Cleveland & Pittsburgh crossing, two miles back, and was on top of the cab putting a pin into the fulcrum when the collision occurred. The safety valve was popping, so that the approach of the freight was not noticed. Baggage-man Miller thinks the train had been standing five or six minutes when the collision occurred. Conductor P. H. Boynton, father of the brakeman, called Miller's attention to the time immediately after the collision and it was 2:32. Brakeman Boynton held that the train had been standing less than three minutes. (The rule does not require him to go back unless the stop is over three minutes.) He testified that the night was clear,

At the C. & P. crossing the train slackened, the signal being against it, and Boynton went upon the rear platform with his red light, but the train did not stop. He had fuses, but did not throw one off because he feared he should unnecessarily detain the fast freight. He saw the headlight of the freight a mile and a half back, and seems to have been on his guard against the freight when he reached Ravenna. He did not lean against the car as testified by the tramp, and did not go out 300 ft. and then come back; claims he went 24 freight-car lengths, and that he started in less than a minute after stopping, the usual stop being only 30 seconds. He waved his lantern and "wondered why the signal was not answered." An intelligent passenger who got off at Ravenna testified that the collision occurred 3 or 3½ minutes after he alighted. Engineman Halman, of the freight, said he ran not over 28 miles an hour between Kent and Ravenna (his maximum rate is 30). He had run from Meadville to Kent, 90 miles, and was doubling back [without rest, apparently]. He did not see the tail lights of No. 8 after leaving Kent until after he passed Boynton, which he says was only four telegraph poles (600 ft.) from the passenger train. There is an electric street light near where the rear passenger car stood, and he thinks that may have tended to prevent his seeing the red light. He had never complained to his superior about this electric light. When he saw the signal he whistled for brakes, but found his sand packed so that it would not run. A freight brakeman testified that the brakes on the refrigerators did not hold well.

#### CHARLESTON.

On the morning of July 4 the two rear cars of a passenger train on the Kanawha & Michigan road ran off a trestle bridge eight miles west of Charleston, W. Va., and fell some 20 ft., one car being crushed to splinters. The conductor and 13 passengers were killed, four passengers fatally injured and 47 others, with a mail clerk, seriously hurt. It is said that only one passenger came out uninjured. Most of the passengers were going on a holiday excursion. The wreck occurred at 7:25 a. m. and from all accounts it appears to have been a simple derailment, caused by the spreading of the rails, which is said to have resulted from worn sleepers. There is no evidence in the reports thus far published of any fault in the trestle itself, but the engine man says that he saw a slight smoke as he approached the spot where the cars were derailed. Not knowing the extent of the fire, and being unable to stop, he put on full steam and the engine and three cars went over in safety. It is reported that the section man who regularly inspects this part of the road generally reaches it at an hour later than 7:25 a. m.

#### TECHNICAL.

##### Manufacturing and Business.

The Pennsylvania Tube Works Co., which has been using the Smith gas producers, has ordered additional tube furnaces and eight producers.

The Maryland Bolt & Nut Co. has been organized by D. L. Bartlett, J. D. Norris and others, to build the proposed factory at Curtis Bay, Md., south of Baltimore. The capital stock is \$109,000.

Mr. John J. Shea, formerly General Supply and Material Agent of the New York Central & Hudson River road, has formed a partnership with Mr. H. P. Sheridan, late Manager of the Bouker Contracting Co. The firm will conduct a general contracting and lightering business, with office at 22 State street, New York. They have recently secured several valuable contracts from New York City for stone for the construction of docks, etc.

The Directors of the West Michigan Car & Engine Co. have elected officers as follows: President, C. M. Heald, General Manager of the Chicago & West Michigan road; Vice-President, H. Park; Secretary and Treasurer, W. S. Wood. The new concern expects to be building cars within 30 days, employing 500 men.

The draft apparatus of the American Continuous Drawbar Co. has been specified for 100 coal cars contracted for by the Vandalia line and 500 cars for the Choctaw Coal & Railway Co.

The Michigan Railway Supply Co., of Detroit, is building a large additional factory 75 × 300 ft. at the Michigan Central Junction. The building is of brick and will increase the capacity to 2,000 brakebeams per day. The firm is also building a factory in Windsor, Ont., for the manufacture of the brakebeams in Canada.

The Standard Air Brake Co., of East St. Louis, has been chartered in Illinois for the manufacture of mechanical appliances. The incorporators are George E. Paul, Frederick Weseman and Charles M. Linhart.

The firm of Fairbanks, Morse & Co., Chicago, has been incorporated under the same name with a capital stock of \$1,000,000. The incorporators are Charles H. Morse, C. A. Sharpe and W. E. Miller.

The Maryland Tube and Iron Works has been incorporated, with H. O. Chapman, of Philadelphia, Pa., as President; J. B. Hayes, of Norristown, Pa., Vice-President, and O. C. Knipe, Secretary, to establish pipe works at Hagerstown, Md. The capital stock is \$800,000.

The Houston & Texas Central croosoting works at Houston, Tex., are now run 12 hours a day, and are croosoting 45,000 ties per month.

The Ohio Car Wheel & Foundry Co., of Toledo, O., has been organized by Alexander De Lano, Thomas C. De Lano and E. W. Collerton. The company has a capital stock of \$50,000, and proposes to manufacture car-wheels and castings of iron and steel.

The Gate City Contracting Co. has been formed with a capital stock of \$25,000 to undertake the construction of railroads, waterworks, etc. The principal office is at Paton, N. M. The incorporators are Charles A. Fox, Stephen W. Dorsey and Virgil E. Hestwood.

The Chicago & Northwestern has ordered 75 day passenger cars to be equipped with the Pintsch gas lighting system. Six new chair cars recently ordered are also to be equipped with the system.



William Sellers & Co., of Philadelphia, have been awarded the contract for the construction of the two 40-ton traveling jib cranes for the New York and Norfolk navy yards at their bid of \$55,465. This company, in addition to submitting the lowest bid, offered to complete both cranes within six months, while the department requirement was nine months for one and eleven months for the other. The cranes are to be used at the new timber dry-docks at New York and Norfolk for placing in position armor plates or other heavy articles on the armed ships. The other bids submitted were as follows: Yale & Towne Mfg. Co., Stamford, Conn., both cranes, \$92,200; Morgan Engineering Co., Alliance, Ohio, both cranes, \$79,596; Southwark Foundry & Machine Co., Philadelphia, both cranes, \$71,522; Weimer Machine Co., Lebanon, Pa., both cranes, \$104,300; American Ship Windlass Co., Providence, both cranes, \$77,708; William Sellers & Co., Philadelphia, both cranes, \$55,465; New York Crane, \$23,960; Norfolk Crane, \$29,000. The bids of the Morgan Engineering Co., the Yale & Towne Co. and William Sellers & Co. are modifications of the department plans.

#### Iron and Steel.

A charter was granted last week to the Spang Steel & Iron Co., of Etta, Pa., with a capital stock of \$1,000,000. The directors are: John W. Chaffant, Campbell B. Herron, C. H. Spang, Geo. H. Chaffant and W. C. Steele. The new concern succeed the old firm of Spang Steel & Iron Co., Ltd., who have operated a steel plant at Etta for a number of years.

The Eureka Cast Steel Co. of Chester, Pa., has just started a new open-hearth furnace with a capacity of 10 tons. A 12-ton steam crane was designed for the plant by Mr. S. Halsey of New York City. It was built by the New Jersey Steel & Iron Co., of Trenton, N. J.

The Roanoke Rolling Mills have, it is reported, been leased by Ellis & Lissig, of Pottstown, Pa., who will run them to their full capacity.

Watts Bros., Middlesbrough, Ky., contemplate erecting a Bessemer converter in connection with their present plant.

The Cambria Iron Co. has closed a contract with the Babcock & Wilcox Co., of New York, for 12 batteries of boilers, aggregating 6,000 h. p., for the works of the company at Johnstown, Pa.

The Philadelphia Engineering Works, Ltd., announces that it has succeeded to the business of Gordon, Strobel & Laurean, Ltd., of Philadelphia, and is now prepared to undertake blast furnace equipment work.

The Brilliant Iron & Steel Co., at Brilliant, Ohio, has decided to build, in the place of its nail factory, an 18-in. bar mill, a 12-in. guide mill and one 8-in. guide train. The contract for machinery has been placed with the Lewis Foundry & Machine Co., Ltd., of Pittsburgh.

The Shenango Valley Steel Co. was organized at New Castle, Pa., last week, with a capital stock of \$3,000,000, all of which has been subscribed. The company will begin the erection of a large plant at once.

**The Basic Accident and the Westinghouse Brake.** From European journals just received it appears that the loss of life in the terrible Basic accident, although almost unprecedented, was less than it would otherwise have been had not six of the coaches remained on the track. The train consisted of 2 engines, 2 express freight cars and 10 coaches. The last six coaches were stopped by the automatic application of the brakes when the couplings were ruptured, and thus were prevented from falling into the chasm.

#### The Rail Market.

**Steel Rails.**—The market continues dull and no large sales have been made. The Union Works of the Illinois Steel Co. have been started up, but the Duquesne Mill of the Carnegies has been closed. The quotations are: at New York, \$30.75@31; at Pittsburgh, \$30 at the mill, and at Chicago, \$31@32.

**Old Rails.**—The quotations for old iron rails at Chicago and Pittsburgh are \$23@23.25. At Pittsburgh the quotation for old steel rails is \$17.50@18, and at Chicago \$14.50@16.50, according to length.

#### New Stations.

The Manhattan Elevated is building two new stations on the Second avenue line, New York City, one at Ninety-ninth and the other at One Hundred and Twenty-first street. The Ninety-ninth street station was opened temporarily this week.

The Knoxville Iron Co., of Knoxville, Tenn., will rebuild its machine shops and bolt department, which were recently burned.

#### Rules of Interchange.

The master car builders' rules of interchange, as revised at Cape May in June, and which are to go into effect on Sept. 1, 1891, will be ready for distribution about July 20, and will be furnished by the Secretary at the same rates as heretofore, viz.: 25 copies, \$1; 50 copies, \$1.75; 100 copies, \$3. A less number than 20 copies at five cents per copy.

#### Electric Fans.

American electric ventilating fan and blower outfits seem to have successfully appealed to foreign markets. Several French journals, we find, are now illustrating and describing electric motor and fan and blower combinations made by American manufacturers, and state that they are now available to European consumers through certain French supply houses. The outfits are of a type which is familiar, and have been made in this country for some time, and seem likely to meet with a ready sale abroad.

#### French Railroad Gauges.

According to M. Yves Guyot, the French Minister of Public Works, there is, at present, no government restriction in France in the matter of the gauge of local railroads. In 1887 the War Department declared itself emphatically against the construction of any new local lines with a gauge of less than one meter. Since then, however, this position has been considerably modified, and there is now not only no tendency to preserve one standard gauge, but a well-defined inclination to permit the adoption of whatever gauge seems most likely to best fit any particular set of conditions.

#### Concrete Under Water.

A simple method of applying concrete under water has been used by the French engineer Heude in connection with the foundation work of the bridge over the River Loire, at Blois. As described in the *Schweizerische Bauzeitung*, the concrete was deposited at the desired points by means of a wooden pipe composed simply of four boards and being about 16 in. square in section. This pipe or tube was lowered vertically into the water, and was made of such length that when the lower end

reached the bottom the upper end projected about 5 ft. above the surface of the water. By means of suitable lifting tackle and scaffolding the tube could be easily raised and lowered and moved from place to place as desired. The tube was filled with concrete, and, on being slightly raised from the bottom, the concrete could flow out and spread itself over the surrounding surface without previously coming into intimate contact with the water. By moving the tube about over any desired area, layers of concrete could thus be readily put down, varying in thickness from 12 to 18 in. The only point to be specially observed was that the level of the concrete in the tube was always above the level of the water on the outside, thus maintaining a sufficient head of concrete to overbalance the tendency of the water to enter at the lower end of the tube. To secure this entire exclusion of water from the tube, the primary filling with concrete was accomplished after having first closed the lower end of the tube with a board; the tube having been filled, this board was withdrawn. It is stated that with one such tube about 80 cu. yds. of concrete could be deposited per day, and that, in general, the results of the method were entirely satisfactory.

#### The Consumption of Rails.

Instructive conclusions may be drawn from the figures of railroad mileage built during the first half of this year, compiled by the *Railroad Gazette*. Our contemporary estimates that the mileage completed during the first six months was 1,610 miles [1,633], against 2,055 miles during the corresponding period last year. Estimating requirements at 90 gross tons per mile, the consumption for new track was roughly 150,000 gross tons during the first half of this year, against about 190,000 tons during the first half of 1890.

It is estimated that the shipments of standard rails during the first six months this year have been 450,000 gross tons. Last year the figure for the mills in the association was 713,205 gross tons, or adding the Allegheny, 775,000 tons. Deducting the requirements for new track from the shipments we obtain a fair idea of the amounts taken for renewals. Last year during the first six months they were, therefore, approximately 555,000 tons. This year, during the same period, they have only been 300,000 tons. This gives numerical expression to a fact generally known and appreciated, the fact that track repairs have been kept down to the lowest possible point by the railroads throughout the land. Current repairs for the enormous mileage of this country are estimated to call for between 900,000 and 1,000,000 gross tons as a minimum. In other words, the poverty of the railroads or their anxiety to keep net earnings at a respectable figure has caused them to withhold necessary orders for rails to the extent of from 150,000 to 200,000 gross tons in six months. That business is, of course, only deferred. The burning question in the rail trade is whether it will come out wholly or in part during the next few months or whether it is to hold over for another year.

The indications, thus far, it must be frankly acknowledged, are that the mills will not be called upon to roll more than a fraction of this delayed tonnage this year. It is even very doubtful whether the second half will get its fair quota of renewal work, which would be 450,000 to 500,000 tons. Nor is the outlook for new mileage very brilliant. Indeed, it is a question whether the second half will carry the total for the year to 5,000 miles, which would call for 3,400 miles in the next six months. It is true that the great Western mills were idle during the first part of this year and that therefore they are now rushed in making deliveries, so that the shipments of the first six months are probably below the average. But orders have been coming in very slowly during the last month and inquiries are on a moderate scale. While it is probable that the second half will be considerably better than the first, the outlook is not favorable for even as good a rail year in 1891 as was 1890, which was decidedly not above the average.—*Iron Age*.

#### The Ingersoll-Sergeant Bar-Channeller in Pennsylvania Quarries.

A bar-channeller, put in by the Ingersoll Sergeant Drill Co., was started in the Diamond Slate Quarry, Argyle, Pa., last week. The company has attached a counter-balance to the machine where the rock runs very slant, and it is now cutting an average of 65 ft. per day, with the rock dipping about 50 degrees. The bar-channeller which was recently sold to the Bangor Union Slate Co., at Bangor, Pa., cuts about 90 ft. per day. Before they put in the bar-channeller they made 2,500 squares per month; with it they now produce 3,000 squares, and at a saving of 25 cents per square, or \$750 per month. Orders for machines have been placed at the Northampton, Star and Standard quarries at Bangor.

#### Some Data on Mannesmann Tubes.

According to an article recently published in the *Revue Universelle* the power required in the rolling of tubes by the Mannesmann process varies from about 2,000 to 10,000 H. P., depending upon the size of the tube. In general, however, the power is required only for short periods of time, brief intermissions being necessary for the adjustment of tube blanks. It is accordingly possible to do the necessary work with an engine developing a comparatively low power by storing up energy in a heavy flywheel revolving at high speed. At the Mannesmann works the flywheel of the 1,200-H. P. engine consists of a cast-iron rim, to which are securely bolted two steel disks measuring about 20 ft. in diameter. Around the circumference of the wheel are wound about 70 tons of No. 5 wire under great tension, thus producing a wheel of unusually high resistance to bursting. The wheel makes 240 revolutions per minute, a point on its circumference therefore traveling about 15,000 ft. per minute. The wheel is mounted on the main shaft, and the tube-rolling machinery is driven through intermediate gearing.

The success of the Mannesmann process depends in no small part upon a practically perfectly homogeneous tube blank and a generally high quality of metal. The tube is therefore itself a guarantee to the purchaser. The tubes are made in lengths up to 21 metres (68.8 ft.), and are of comparatively light weight. The great length available reduces the number of couplings necessary for a pipe line, and constitutes one of the important advantages claimed in point of economy.

#### A New Device for Raising Water.

A scheme for raising water from wells or other sources of supply to tanks for watering locomotives has been patented by Messrs. M. Burt and J. W. Skilton, of Jacksonville, Fla., and is being developed by the Acme Water Lift Company, with headquarters in that city. The device will be in operation experimentally within a few weeks on the Jacksonville, St. Augustine & Halifax River Railroad, and we are informed that experimental plants have been arranged for on several other roads. The device consists of a bucket, with a capacity of about

2,000 gallons, which is raised from the well or reservoir by a locomotive and which automatically empties itself into the water tank. The idea is to hook on to any part of the locomotive or moving train with a wire rope which runs through suitably arranged sheaves. Then, as the engine moves away the bucket is lifted to the elevation necessary. The length of this rope will depend upon the depth of the well and the amount of reduction in the diameters of the sheaves intervening between the engine and the bucket. Of course the power required to lift the bucket may be made very small by sufficiently gearing down.

When the bucket has emptied itself the rope is cast loose from the locomotive and the bucket runs back down the well. The descent of the bucket is controlled by a governor which is out of gear while the bucket is rising, but is thrown in as it descends. This governor applies a brake, the pressure of which increases with the velocity of the descent of the bucket. The well is covered and uncovered automatically.

The object of the inventor has been to provide an apparatus that will do away with the necessity for stationary pumps of any kind, and for attendants, at water tanks. Models have been constructed and operate satisfactorily, but we believe that no full-sized apparatus has yet been put in operation.

It is proposed to use the same apparatus to raise water for irrigating. In such applications of it animal power will be used to raise the bucket.

#### An Electric Launch.

Among other interesting exhibits at the electrical exposition now being held at Frankfurt on the Main, Germany, is an electric storage battery launch built by Messrs. Escher Wyss & Co. in conjunction with the well-known Oerlikon Machine Works, of Switzerland. The launch has been named the "Zürich," and during the time of the exposition will perform regular passenger service on the river, thus affording visitors an excellent opportunity to witness its performance. The launch is about 50 ft. long on the water line, and is driven by a battery of 56 accumulators, arranged in series, and capable of a maximum effect of 80 amperes and 110 volts, approximating closely to 10 horse power. The electric motor used in connection with the battery is of the two-pole type and runs at a speed of about 350 revolutions per minute. It is coupled direct to the propeller shaft, the shaft itself measuring about 2.3 ft. in diameter. The speed of the launch is in the neighborhood of 7½ miles per hour, and the accumulators, when fully charged, are good for a distance of about 50 miles. Recent trials of the launch are said to have given very satisfactory results, the above mentioned speed of 7½ miles per hour having been attained with a current of only 75 amperes and 102 volts. The launch can carry about 100 passengers.

#### Screw Ferryboats.

The second screw ferryboat of the Hoboken Ferry Co., concerning which we gave some particulars in a recent issue, is now receiving her machinery at Hoboken. The third was to have been launched yesterday at Newburgh. As we have already stated, the Pennsylvania is now building two at Moore's Yard in Elizabeth, the engines for which are being built in the Pennsylvania shops at Hoboken.

#### Fireless Locomotives.

As examples of the latest practical development of the fireless locomotive system, first introduced in France in 1872 by Dr. Lamm and M. Léon Francq, the *Revue Industrielle* of May 30 illustrates and describes the locomotives in use on the street-car line from Paris to Saint Germain which was opened last year. The length of line between these two points, direct, is about 11½ miles, but the total length, with several short branch lines, amounts to about 13 miles. Fifteen fireless locomotives are employed, nine of which are of the latest and most improved pattern.

#### THE SCRAP HEAP.

##### Notes.

The dining-car service on the Cleveland, Cincinnati, Chicago & St. Louis will hereafter be operated by the company directly.

It appears that the excessive shipments of mail reported a month or two ago from Colorado and from Iowa were in both cases the work of the same parties. The Government has decided that the mails passing over the Rio Grande Southern must be again weighed for a month, beginning July 15.

A hailstorm in North Dakota July 2 is said to have been the worst experienced there in 20 years and it is reported that 10,000 acres of grain was cut down in Ramsey and Sargent counties. The destruction by a similar storm in Madison county, Ia., on the same day is said to have been complete throughout a space of 6 miles wide and 13 miles long. At Thomaston, Ind., the same day, passenger cars were blown off the track.

The Supreme Court of Appeals of Virginia has decided the State law forbidding the running of freight trains on Sunday to be unconstitutional, on the ground that it interferes with the right of Congress to regulate interstate commerce. The test was made in the case of the Norfolk & Western, which was indicted in Pulaski county and convicted in the Pulaski county and the circuit courts and then appealed. Judge B. W. Lacy dissented.

The "Confidential Memorandum," containing a list of individuals who have isolated railroad passes, comprises 19 pages devoted to individuals and seven to the minor weekly newspapers. Among the individual delinquents are ministers and national, State and local officials, who are charged with having sold, loaned, altered, extended and even forged passes and special and editorial trip and mileage tickets.—*New York Herald*.

The Kansas State Board of Railroad Assessors has reduced the assessments against the railroads \$10,000,000. The assessed valuation of railroad property has increased yearly for the last four years, while other assessments have decreased, until last year they were 17 per cent. of the total assessed valuation of state property. People complain that the railroads are unduly favored, but the Board defends itself. It complains, however, that the companies insist upon adding the yearly expenditures in improvements to the original cost of the road to make its total cost. The Board says it has discovered that the actual cash cost of the lines in the state is not more than one-third, in many instances not more than one-tenth, of the total cost as shown in the reports of the companies.

The Supreme Council of the Federation of Railway Employees met in Terra Haute, Ind., last week. Grand Master Sargent, of the Firemen, was re-elected President of the Council, and John A. Hall, Secretary of the Switchmen's Mutual Aid Association, was elected Sec-



retary and Treasurer to succeed Sheehan, of the Brotherhood of Trainmen, whose order was expelled from the Federation. The Council now consists of nine members, three from each of these orders: Firemen's Brotherhood, Brotherhood of Railway Conductors and the Switchmen. The applications of the Order of Railway Telegraphers and Brotherhood of Railway Station Masters for admission were rejected. The application of the Order of Railway Conductors was withdrawn because of the action of the Council on Monday in expelling the Brotherhood of Railroad Trainmen.

#### The Aqueduct Suit.

The action of O'Brien & Clark against New York City to enforce a claim for \$800,000 for extra work done on section 6 of the new aqueduct has been dismissed by Justice Ingraham in the Supreme Court. This is one of a number of similar claims aggregating nearly \$9,000,000.

The contractors claim that the extra work done, while not specified in the contract, was necessary and was authorized by competent agents of the city. Justice Ingraham rules that the legislature passed an act under the provisions of which the work was done, and that no person had power to bind the city beyond the provisions of that act. The contract contemplated the excavation to the line of the tunnel only, and provided that any space remaining should be filled in by the contractor. Consequently no payment could be made for excavation beyond the tunnel line. Judgment is allowed for \$19,157.58, the amount conceded by the city to be due. It is said that the case will be appealed.

#### American Locomotives in Brazil.

The United States Consul-General at Rio de Janeiro states that the sales of locomotives of American manufacture in Brazil have been very large. One firm in Philadelphia (the Baldwin Works) during the last 10 years has sold 251. The sales for each year were as follows: 1881, 16; 1882, 35; 1883, 27; 1884, 32; 1885, 8; 1886, 21; 1887, 17; 1888, 19; 1889, 45; 1890, 26.

#### Fall of a Highway Bridge.

On July 4 a wooden high bridge across the Delaware River at Margarettown, N. Y., fell under a considerable crowd of people. The people were crossing the bridge during a Fourth of July celebration, and took step in time with the music of a band which happened to be playing. The result was that the bridge fell, and about 75 men, women and children dropped into the stream about 12 ft. below. By wonderful good fortune only one was killed, a baby two years old. One woman appears to have been quite seriously injured, and a good many persons were slightly injured.

#### Moving 400 Cars "Quietly."

At a cost of nearly \$6,000 and two months of time, the Grain Growers' Association of Minnesota has succeeded in establishing the fact that the Duluth elevator companies have shipped 279,000 bushels of wheat without inspection and a large part of it under cover of night. The Association asserts that this is *prima facie* evidence that the elevator people were seeking to swindle the farmers either by stealing the wheat outright or billing it out as rejected, and getting it graded as No. 1 Northern at Buffalo. The elevator men, however, insist that the grain was bin-burned, and that with the consent of the State Warehouse Commission they were shipping it away quietly to avoid a panic. They assert that had they bulletined nearly 300,000 bushels of wheat as damaged it would have caused such a flurry in the grain markets all over the country that a panic would have resulted, and the Minnesota farmers themselves would have been the greatest sufferers, because of the immediate stigma which would have attached to the Minnesota grades. The "wheat steal" legislative committee has adjourned until January.—*St. Paul Dispatch.*

#### Canadian Railroad Statistics.

The railroad statistics blue book presented to the Dominion Parliament last week shows a total length of railroads in operation in Canada on July 1 of last year to have been 13,256, or practically one mile for every 400 persons, a ratio slightly in excess of that of the United States. The construction during the year was 571 miles, which is somewhat in advance of the record since 1885-6, when 994 miles were added. The progress is best appreciated by a comparison with 1867, the year of confederation, when the railroads in what is now Canada covered only 2,258 miles. In 24 years they have been multiplied six times. In the United States in the same time the mileage has been increased four times. While the railroads of 1867 earned \$11,468,277, those of 1890, though six times the length, carrying about five times the number of passengers and more than five times the quantity of freight, earned only four times the amount of money, or in all \$46,843,826. The working expenses have increased at a more rapid rate. From about \$7,000,000 in 1867 they have grown to \$32,913,350 in 1890. Of main line 13,339 miles was laid with steel and 665 miles with iron rails. The length of track actually laid at the date of the return was 14,004 miles. The equipment consists of 1,771 locomotives, 85 sleeper and parlor cars, 806 first and 604 second class cars, 525 mail and express, 32,381 cattle and box, 13,731 platform and 3,236 coal cars. The monetary investment represented in the above is \$786,447,811, showing the average cost per mile of equipped road to be \$56,174, as compared with \$60,309 in the United States. Toward this private enterprise contributed \$43,218 a mile or in all \$605,043,000. The remainder was made up of \$9,981 a mile or \$130,745,690 from the Federal Parliament, \$426 a mile or \$5,977,000 from the Ontario Legislature, \$757 a mile or \$10,599,758 from the Quebec Legislature, \$305 a mile or \$4,273,373 from the New Brunswick Legislature, \$141 a mile or \$1,977,395 from the Nova Scotia Legislature and \$158 a mile or \$2,221,250 from the Manitoba Legislature, \$57,500 from the British Columbia Legislature, and \$979 a mile or \$13,709,000 from municipalities. The whole net earnings, \$13,916,000, is only 1.8 per cent. on the capital cost of \$786,447,811. It is only 3.85 per cent. on the bonded debt.

#### Additions to the Lake Tonnage.

Notwithstanding the depression in lake freights the *Inland Lloyd's Register* for July contains the names of nine new steamboats, with 8,767 tons net register and the aggregate value of \$1,210,000, with one tankboat built at West Superior for the Standard Oil Company, bringing the aggregate tonnage and value up to 9,066 and \$1,238,000 respectively.

#### LOCOMOTIVE BUILDING.

The Houston & Texas Central has purchased ten 60-ton engines at one of the locomotive works at Paterson, N. J., which were shipped last week.

The Rio Grande Western has ordered three new standard gauge locomotives from the Baldwin Locomotive

Works, and will probably soon order two other freight locomotives.

The Toledo, St. Louis & Kansas City has placed an order with the Rhode Island Locomotive Works for 20 passenger and freight locomotives.

It is reported from Paterson, N. J., that the Cooke Locomotive Works will close in a few days, owing to dullness in business. Nearly all the hands will be discharged this week, about 1,000 men being thrown out of employment.

The Brooks Locomotive Works shipped last Saturday the first two locomotives of an order of nine to the Cincinnati, Hamilton & Dayton, and will complete the other seven within a week. They are constructing a locomotive for the Standard Oil Co. and will shortly begin shipping 10 locomotives for the Lake Shore & Michigan Southern.

#### CAR BUILDING.

The Toledo, St. Louis & Kansas City has awarded a contract for building 500 box cars to the Michigan Car Co., of Detroit.

The Rio Grande Western has recently ordered eight first class passenger cars and three combination cars for the branches being made standard gauge.

The Wabash has just completed at its shops at Toledo, O., two parlor cars for vestibuled trains. Other passenger cars are being constructed at these shops.

#### BRIDGE BUILDING.

**Birmingham, Ala.**—The great iron bridge which spans the railroad tracks along the line of Twenty-first street, uniting the north and south sides of the city, and has been in course of construction about 18 months, has been opened for traffic. The total length is about 1,000 ft. The principal spans are 79, 97 and 70 ft., while there are seven other spans of shorter length. On one end there is a stone approach 60 ft. in length. The bridge is 30 ft. above the railroad tracks and cost \$80,000. It has two footways 8 ft. each and a 24-ft. roadway. The railroads paid the cost of the superstructure over their tracks, amounting to about \$17,000. The remainder of the expense has been borne by the city.

**Bourne, Mass.**—The town of Bourne, in special town meeting last week, voted to construct a bridge across Cohasset Narrows.

**Buffalo Mills, Va.**—The bridge to be built by the Rockbridge Co. will consist of two spans, one 120 ft., the other 60 ft., and will have a roadway 14 ft. in the clear.

**Chester, S. C.**—The County Commissioners have just completed an iron bridge across the Sandy River, three miles west of Chester, which cost \$7,000.

**Dallas, Tex.**—The City Council of Dallas has adopted a resolution inviting bids for the construction of a bridge 20 ft. wide, which is to cost not more than \$20,000.

**Floresville, Tex.**—Plans have been prepared for the erection of two iron bridges over the Cibola Creek. The County Commissioners will soon let the contract.

**Fort Erie, Ont.**—The Parliamentary Railroad Committee has reported the bill incorporating the Buffalo & Fort Erie Bridge Co., which authorizes the company to construct a railroad bridge across the Niagara River or a tunnel from Fort Erie, above the international bridge, to near Buffalo. Similar powers will be asked from Congress or the New York State Legislature. The capital stock will be \$10,000,000. The bridge or tunnel must be commenced within five years.

**Glenwood, Pa.**—A board of army engineers held a meeting at Pittsburgh last week to pass upon plans for a new bridge across the Monongahela River at Glenwood. The proposed structure is to be built for the Second Avenue Electric Railway within 1,000 ft. of the present Baltimore & Ohio bridge. It will have three piers in the river, with a channel span of 303 ft. and a height of 52 ft. The river men opposed the narrow channel span, and asked also that the height be made 62 ft.

**Kenedy, Tex.**—The Commissioners of Karnes County, Tex., have decided to build an iron and steel bridge over the river near Kenedy.

**Lewiston, N. Y.**—At a meeting recently held at Lewiston by the board of Commissioners of the Lewiston & Ontario Bridge Co., Frank Spalding was elected President of the board, and L. R. Stanborn appointed Secretary and Thomas M. Griffith, Engineer. The site for the proposed bridge is 300 ft. below the old suspension bridge.

**Lexington, Va.**—The Lexington Development Co., of Lexington, Va., have advertised for bids for the erection of another iron bridge.

**Macon, Ga.**—The East Tennessee, Virginia & Georgia Railroad is having an iron bridge built over Poplar street, in Macon. The East Tennessee Railroad bridge, five miles below Macon, will soon be provided with a draw. Already the pier for the draw is above the water, and its construction will now proceed rapidly.

**McMillan, Mich.**—The bill to authorize the town of McMillan, Ontonagon County, to issue its bonds for the purpose of constructing new bridges, has become a law.

**Montreal, Que.**—A bill to amend the act of incorporation of the Montreal Bridge Co. has been introduced in the Common Council. It proposes several important modifications in the original plans. The bill of last session provided that the Montreal terminus of the bridge should be in St. Mary's Ward. The new bill changes this to any point in Montreal. The committee last session amended the bill to provide a clear headway of 150 ft. from high water. The new bill seeks to restore the height fixed in the original bill, viz., 120 ft. The company asks power to issue bonds to an amount not exceeding \$6,000,000, double the amount now authorized.

**Niagara, Ont.**—The Dominion Senate Committee on Railways and Canals has reported against the bill to incorporate the Whirlpool Bridge Co., and the Senate has adopted the report.

**Ohio County, W. Va.**—Last week the County Commissioners of Ohio County, W. Va., let the contract for a new 200-ft. steel-truss highway bridge over Wheeling Creek to the Massillon Iron Bridge Co., of Massillon, O., for \$2,900. The bridge takes the place of an old stone structure that was built in 1820 when the national road from Washington to St. Louis was built.

**Panna Maria, Tex.**—The Commissioners' Court of Karnes county has decided to build an iron and steel bridge over the San Antonio River opposite Panna Maria.

**Parkersburg, W. Va.**—The Ohio River Railroad have let the contract for the masonry of the new bridge across the Guyandotte River to J. H. Stanley & Co., of Ceredo, W. Va.

**Pittsburgh, Pa.**—Recently a bill has been introduced in the Common Council authorizing the construction of a bridge across the Monongahela River at the foot of Eighth street.

**Riddleville, Tex.**—The Commissioners of Karnes county propose to erect an iron and steel bridge over the Ecleto River at Riddleville.

**Rochester, N. Y.**—It has been proposed to construct a new bridge over the tracks of the New York Central on East Main street, at an estimated expense of \$85,000. The city is not likely to take any definite action this year.

**Slattington, Pa.**—The County Court at its next meeting will be asked to erect a new bridge over Trout Creek extending from Lower Main street to Church street.

**Valentine, Neb.**—The County Commissioners will receive bids at Valentine this week for building two bridges in Cherry County, one over the North Loup River, to have three spans of 32 ft. each, the second to be across the Niobrara River, 12 miles east of Valentine, to consist of two spans of 56 ft. each.

**Wilmington, Del.**—The Levy Court has decided to erect a new iron bridge at Cooch's Mills.

**Winston, N. C.**—Work on the iron bridge across Wachovia Brook is being pushed by the Winston-Salem Land & Investment Co., and it is expected that the structure will be finished in 30 days. This bridge is to have a single span of 104 ft., and is for electric cars, roadway and sidewalks, and connects Winston-Salem with the company's property.

**Zoar, O.**—A long bridge is to be built over the Catawagus Creek at Zoar.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Carriage of Goods and Injuries to Property.

In Texas the Supreme Court rules that under the statute imposing a penalty on common carriers for refusing to give, when it is demanded, a bill of lading stating "the quantity, character and condition of the goods" received for transportation a railroad company incurs the penalty by giving a bill of lading for lumber describing it as "a carload" only, when the shipper demands that the weight be stated.<sup>1</sup>

In New York the Supreme Court rules that negligence whereby the property of an abutting owner is injured cannot be imputed to a railroad company by reason of its running freight trains on the track nearest the house of the owner. The mere fact that trains were long and heavy and needed two engines was no evidence of negligence. Nor can negligence be predicated in respect to such adjacent owner from the fact that the company placed its tracks on one part or another of its own land.<sup>2</sup>

In Kansas the Supreme Court holds that an abutting lotowner cannot recover damages by reason of the location of a railroad, duly authorized by the city council, along one of the regularly laid-out streets of a city, unless there has been a practical obstruction of the street in front of his premises and he is virtually deprived of access to his property. The failure alone of a railroad company to properly ballast its roadbed, where sufficient space is left in the street for ordinary vehicles and teams to pass in front of abutting property, will not authorize a recovery for damages alleged to have been sustained for the destruction of one's right of ingress and egress where there is no evidence to show the terms and conditions upon which the privilege to build such railroad was conferred by the city authorizing the same.<sup>3</sup>

In Mississippi the Supreme Court decides that when a railroad enters upon and appropriates land for a right of way without consent of the owner or without proper legal proceedings, it becomes a trespasser, and will not be relieved of liability therefor by subsequent proceedings to secure a right of way; and, in considering what is due compensation for the easement so acquired subsequent to the trespass, the trespass itself is not involved nor to be considered.<sup>4</sup>

In Minnesota the Supreme Court rules that where a railroad unlawfully constructs its road in a public street so as to interfere with the private rights of abutters, it constitutes a continuing trespass, for which successive suits for damages may be brought so long as the trespass is continued, though the railroad changes hands in the mean time.<sup>5</sup>

In Ohio the Supreme Court holds that where one railroad abandons a part of its right of way to another by means whose effect is to terminate the easement and cause the land to revert to the owner, and such owner sees the construction of the second road thereon without objection, and allows the expenditure of money thereon on the faith of his apparent acquiescence, though he is estopped to reclaim the land thereafter or to enjoin its use by the railroad company, he may recover compensation for such use.<sup>6</sup>

##### Carriage of Goods and Injuries to Property.

In Indiana the Supreme Court holds that a contract binding a carrier to transport as many car-loads of grain as the shipper may desire to be transported is valid, at all events as to grain already transported under it.<sup>7</sup>

In Colorado in an action against a railroad to recover the value of an express package, it appeared that the express car, with three others, was blown from the track by a gale, into such a position that all the goods must have been thrown into one corner at the top; that the car was immediately set on fire by coals from the stove, and burned so rapidly that the messenger escaped with difficulty; and that the wind was so fierce as to make it almost impossible to stand or walk, and the air so full of dust that one could scarcely see. This is held by the Supreme Court sufficient evidence to support a finding that the proximate cause was the "act of God," and not the failure of the company to remove the goods after the car was overturned.<sup>8</sup>

In a Texas case no depot was maintained at M, and it was the custom to deliver freight for that place from the depot at T, the conductors of freight trains acting as freight agents at M. The Supreme Court holds that tender of the charges and demand for the goods by a consignee could be made at T, where the goods were retained, and the penalty imposed by the statute for refusing to deliver freight on tender of charges was incurred by refusal to deliver at T.<sup>9</sup>

In Kansas a landowner agreed to convey land to a railroad for its right of way on condition that it should erect and maintain a side track and certain buildings. The company took possession, built its road, and attempted the performance of the condition. There was an honest difference of opinion between it and the owner as to whether the condition had been fully performed,



and the owner instituted condemnation proceedings as if no contract had been made. The railroad company applied for a perpetual injunction against the maintenance of such proceedings. The Supreme Court holds that it was proper to restrain the owner from prosecuting his action until the merits of the injunction suit were determined.<sup>10</sup>

In Maryland the Supreme Court of Appeals rules that an instruction that reasonable damages for occupation of land by a railroad for construction of its tracks would be the fair rental value of the ground during the time and for the purpose it was occupied, is not misleading when coupled with further instructions not to include damages for the original construction of the roadbed, nor damages for the fee-simple value of the land, nor to consider the peculiar value of the land to the railroad company, nor its necessity as part of its line, nor the profits derived from its use. But damages cannot be confined to the rental value of the land at market rates to other parties.<sup>11</sup>

In Minnesota the Supreme Court holds that a city ordinance authorizing a railroad to construct its road in a public street, gives it the right to do so only as against the public, but not as against owners of the abutting premises having private property rights in the street, who may maintain an action for the damages resulting to them.<sup>12</sup>

In Virginia the Court of Appeals declares that one who, after the construction of a railroad, purchases land adjacent thereto, can recover of the railroad company for damages to his crops through the overflow of streams, owing to the fact that, in the construction of the railroad, no sufficient drains or outlets for these waters were provided. Two Judges, however, dissented from this doctrine.<sup>13</sup>

In Georgia the Supreme Court rules that where a mare ran along a railroad track ahead of a train until she fell into a trestle and was injured, and the train was almost stopped to allow her to escape, and the whistle was blown continuously to frighten her from the track, her owner has no right of action for the injuries.<sup>14</sup>

In New York the Supreme Court holds that a railroad which, in compliance with the statute, maintains fences on the sides of its road, is not bound, as against the owner of adjoining land, to close a gate therein built in accordance with law for the use of the owner, although its officers have notice that the gate is open; and the company is not liable for damages for the death of stock pastured on such adjoining land by permission of the owner, passing therefrom through the gate to the rail road, and killed there by a passing locomotive.<sup>15</sup>

#### Injuries to Passengers, Employees and Strangers.

In Massachusetts it is held by the Supreme Judicial Court that the fact that a person injured in a collision while riding on a freight train at the invitation of the conductor, was an old employee of the railroad company, and that some of the conductors had permitted old employees to ride on their freight trains, is not sufficient to establish a custom which would make the company liable to him as a passenger in the absence of evidence showing that the general officials of the road had notice of the action of the conductors, or that such action had so long continued as to give rise to a presumption of knowledge by these officials.<sup>16</sup>

In Kentucky the Court of Appeals holds that a railroad which has bought a road already built is not responsible for injuries caused by the negligent running of trains over its road before it bought the road.<sup>17</sup>

In Michigan an employee of the defendant while pushing a handcar along one of the tracks in the yard fell into a ditch which had been dug across the track the day before under the direction of the yardmaster (but of which he was ignorant and which he found behind the car could not see). The Supreme Court rules that an instruction that it was the master's duty to furnish his employees with a safe place in which to work, and that this duty could not be delegated so as to make the persons performing it fellow-servants with those employed in handling lumber, was not open to the objection that it virtually made the master an insurer of his employees, when followed by other instructions that there could be no recovery unless the ditch had been negligently left unguarded at its intersection with the track.<sup>18</sup>

In New York a brakeman in attempting to pass across the tender in the performance of his duty, stepped on a man-hole cover in the tender which turned and caused him to fall and receive the injuries complained of. The man-hole cover was made of iron, lined with a circular plank slightly smaller than the hole so as to hold the cover in place; but this lining was absent at the time of the accident, and there was some evidence that plaintiff knew this, though he testified that he did not. The Court of Appeals holds that if the plaintiff knew the lining was off he was guilty of negligence and cannot recover.<sup>19</sup>

In Alabama the Supreme Court rules that where coal was placed near a railroad track by consent of the yardmaster, there could be no recovery for an injury received by him in an accident caused thereby.<sup>20</sup>

In New York the Supreme Court of Appeals decides that an instrument executed by a railroad employee after he has entered the service, releasing the company from all liability for any damage or injury to him by reason of the company's negligence, is void for want of consideration, there being no promise on the part of the company to give him other or new employment or to continue him in its service.<sup>21</sup>

In Missouri it is held by the Supreme Court that by the death of a postal clerk in a collision occasioned by negligence, the railroad company incurs the penalty imposed by the Missouri law of 1889, section 4425, providing that when any person shall die from any injury occasioned by negligence of its officers or agents in running the trains, etc., it shall pay for such person or passenger so dying \$5,000.<sup>22</sup>

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Central of New Jersey*, quarterly, 1½ per cent., payable Aug. 1.

*Long Island*, quarterly, 1½ per cent., payable Aug. 1.

*Minehill & Schuylkill Haven*, \$2 per share, payable July 15.

*New Orleans & Carrollton*, quarterly, \$1.50 per share, payable July 6.

*Peoria & Pekin Union*, quarterly, 2 per cent., payable in July.

*Toledo & Ohio Central*, quarterly, 1½ per cent. on the preferred stock, payable July 15; and quarterly, 1 per cent. on the common stock, payable Aug. 15.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Alabama Midland*, annual, Montgomery, Ala., July 15.

*Duluth, South Shore & Atlantic*, annual, Marquette, Mich., July 16.

*Marquette, Houghton & Ontonagon*, annual, Marquette, Mich., July 16.

*Mineral Range*, annual, Hancock, Mich., July 14.

*New York & Massachusetts*, annual, Poughkeepsie, N. Y., July 14.

*Rio Grande Western*, annual and special, Board of Trade Building, Salt Lake City, Utah, July 27.

##### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.

The *Southern Railway Club* holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1122 Jirard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* hold regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Science Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

The *Association of Civil Engineers of Dallas* meets at 808 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Montana Society of Civil Engineers* meets at Hel-

ena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

##### Engineers' Club of Cincinnati.

The regular meeting of the club was held on June 18, with twenty-one members and several visitors present. Four new members were elected. Mr. A. S. Hobby read a paper on "Brick Masonry."

##### The Roadmasters' Association of America.

The next annual convention of the Roadmasters' Association of America will be held at Minneapolis, Sept. 8, 9 and 10.

##### Technical Society of the Pacific Coast.

A regular meeting of the Technical Society of the Pacific Coast was held July 3, at the rooms of the Society, Academy of Science Building, No. 819 Market Street, San Francisco. The following subjects were announced for discussion: Continuation of the paper on "Abrasive processes in the mechanic arts, including a description of the Poole system of grinding calendar rolls," by John Richards, M. E.; "Physical and geological traces of permanent cyclone belts," by Marsden Manson, C. E.; "On the use of the figure 9 as a check in arithmetical calculations," by Hubert Vischer, C. E.

#### PERSONAL.

—Mr. C. M. Weed, who has been General Freight Agent of the Paducah, Tennessee & Alabama road since the company began business, has tendered his resignation today.

—Chairman George G. Crocker, of the Massachusetts Railroad Commission, is still in office, the Republican Council having voted, 8 to 1, not to confirm the Democratic Governor's nomination of Chauncey Smith to succeed Mr. Crocker. Mr. Smith is 72 years old.

—Mr. George W. Stevens, General Superintendent of the Chesapeake & Ohio, has been appointed General Manager of the road. Mr. Stevens will be remembered as the Assistant General Superintendent of the Wabash road a number of years during the receivership. He became connected with the Chesapeake & Ohio early in 1889 as General Superintendent, and since then has had charge of the operating department.

—Mr. Richard Poillon, the ship builder, died July 4 at his residence in New York City of neuralgia of the heart, superinduced by the "grip" and pneumonia. Mr. Poillon was born in New York on Nov. 18, 1817. He came from an old Huguenot family, and followed the business of his father, who owned one of the largest shipyards in that region. After the death of the elder Poillon the business was conducted by the brothers, Cornelius and Richard. Cornelius Poillon died 10 years ago and Richard's son James became his father's partner. Among the earlier famous boats built by the Poillons was the yacht "Sappho." During the war they contributed two wooden gunboats, one the "Winona," to the United States Navy. The firm next engaged in building steamers for private owners. In 1872 they built the "Kuroda" and the "Capron," the first modern vessels owned by the Japanese government. Both were war ships. In 1871 they built the famous schooner yacht "Dreadnaught," and since then they have turned out many famous yachts.

#### ELECTIONS AND APPOINTMENTS.

*Atlantic Coast Line.*—H. Walters continues as Vice, President of this system. He has resigned the office of General Manager only.

*Bath, Small Point & Popham Beach.*—At a meeting of the incorporators this week the following Board of Directors was chosen: P. O. Vickery, J. H. Manley, M. B. Spinney, F. P. Sprague, D. T. Percy, Mr. Tibbitts, Portland, Me., and Mr. Foster of Waterville. P. O. Vickery was elected President, George W. Hunt, Secretary, and John O. Shaw, Treasurer.

*Central Vermont.*—F. W. Baldwin has been transferred to be Assistant Superintendent with headquarters at St. Albans, Vt. Mr. Baldwin will be succeeded as Superintendent of the Ogdensburg & Lake Champlain, by Frank Owen, General Freight Agent. E. A. Chittenden, Superintendent of the local freight traffic of the Central Vermont, has assumed charge of the local freight traffic of the Ogdensburg & Lake Champlain division.

*Chesapeake & Ohio.*—G. W. Stevens has been appointed General Manager. The following appointments have been announced: M. Frazier, promoted to be Chief Engineer, with office at Richmond, Va. W. F. LaBonta appointed Purchasing Agent, in addition to his duties as General Storekeeper. J. M. Gill appointed Superintendent, and H. Pierce, Engineer Maintenance of Way of the Huntington division, with office at Huntington, W. Va. H. C. Boughton appointed Superintendent, and F. W. Scarborough Engineer Maintenance of Way of the Cincinnati division, with office at Cincinnati, O. The office of Assistant Superintendent on these divisions has been abolished.

W. F. LaBonta has been appointed Purchasing Agent in addition to his duties as General Storekeeper, with office at Richmond, Va.

*Chicago Junction Railways & Union Stock Yards.*—At the annual meeting this week in Jersey City, N. J., the following Board of Directors was elected: Chauncey M. Depew, John Quincy Adams, Edward J. Phelps, William J. Sewell, Frederick H. Prince, Frederick H. Winston, Hugh C. E. Childers, Francis Barron Blake, Bernard T. Bosanquet, Adolph von Andre, Executive officers were chosen as follows: President, F. H. Winston, of Chicago; Vice-President, John Quincy Adams,

<sup>1</sup> *Texas & P. Ry. Co. v. Cuteman*, 14 S. W. Rep. 1,069.

<sup>2</sup> *Finn v. New York Cent. & H. R. R. Co.*, 12 N. Y. S. 341.

<sup>3</sup> *Wichita & C. Ry. Co. v. Smith (Kan.)*, 25 Pac. Rep. 623.

<sup>4</sup> *Canton, A. & N. R. Co. v. French*, 8 South. Rep. 512.

<sup>5</sup> *Lamm v. Chicago, St. P. M. & O. Ry. Co.*, 47 N. W. Rep. 455.

<sup>6</sup> *Pennsylvania Co. v. Platt*, 25 N. E. Rep. 1,023.

<sup>7</sup> *Cleveland, C. C. & I. Ry. Co. v. Closser*, 26 N. E. Rep.

<sup>8</sup> *Blythe v. Denver & R. G. Ry. Co. (Colo.)*, 25 Pac. Rep. 702.

<sup>9</sup> *St. Louis, A. & T. Ry. Co. v. McKee*, 15 S. W. Rep. 45.

<sup>10</sup> *Harvey v. Kansas N. & D. Ry. Co.*, 25 Pac. Rep. 412.

<sup>11</sup> *B. & O. R. Co. v. Boyd*, 20 Atl. Rep. 202.

<sup>12</sup> *Lamm v. C. St. P. M. & O. Ry. Co.*, 47 N. W. Rep. 455.

<sup>13</sup> *A. & D. R. Co. v. Peake*, 12 S. E. Rep. 318.

<sup>14</sup> *Gay v. Wadley*, 12 S. E. Rep. 298.

<sup>15</sup> *Diamond Brick Co. v. N. Y. C. & H. R. R. Co.*, 12 N. Y. S.

<sup>16</sup> *Powers v. Boston & M. R. Co.*, 26 N. E. Rep. 446.

<sup>17</sup> *Louisville & N. R. Co. v. Orr*, 15 S. W. Rep. 8.

<sup>18</sup> *Sadowski v. Michigan Car Co.*, 47 N. W. Rep. 598.

<sup>19</sup> *McQuigan v. D. L. & W. R. Co.*, 26 N. E. Rep. 13.

<sup>20</sup> *Highland Ave. & B. B. Co. v. Walters*, 8 South. Rep. 357.

<sup>21</sup> *Purdy v. R. W. & O. R. Co.*, 26 N. E. Rep. 225.

<sup>22</sup> *McGoffin v. M. P. Ry. Co.*, 15 S. W. Rep. 76.



of Boston: Chairman of the Advisory Committee, Chauncey M. Depew; Secretary, William C. Lane, of New York; Treasurer, Thomas Sturgis, of Chicago.

**Chicago, Rock Island & Pacific.**—S. F. Boyd, First Assistant Ticket and Passenger Agent of this company, whose headquarters have heretofore been at Topeka, Kan., will be removed to Chicago; T. J. Anderson, General Agent of this company at Topeka, Kan., has been appointed Assistant General Ticket and Passenger Agent in addition to his present duties. His headquarters will be at Topeka.

**Cleveland, Cincinnati, Chicago & St. Louis.**—The office of Superintendent of Bridges and Buildings has been abolished. J. B. Mitchell, who has held the position, will be retained in the service of the company. Buildings and bridges now come under the jurisdiction of the engineers of maintenance of way.

**Cumberland Gap Dispatch.**—Andrew Broadbuss, late General Agent of the Virginia, Georgia & Tennessee Air Line, has been appointed General Manager of the new Cumberland Gap Dispatch.

**East Line & Red River.**—J. W. Chatham has been appointed Freight Claim Agent of the road, with headquarters at Greenville, Tex.

**Fort Smith, Paris & Dardanelle.**—At the annual meeting of the stockholders, held at Fort Smith, Ark., June 20, the following directors and officers were elected: Directors, H. W. Bush, P. D. Peters, J. W. Bush, J. W. North, William M. Cravens, Thomas Boles and J. H. Carnell. Officers: H. W. Bush, President; Thos. Boles, Vice-President; P. D. Peters, Secretary and General Superintendent, and J. W. Bush, Treasurer.

**Galveston, Harrisburg & San Antonio.**—At the annual meeting of the stockholders of the company this week the following directors were elected: Collis P. Huntington, I. E. Gates, E. H. Pardee, Charles Babidge, C. C. Gibbs, J. Kruttschnitt and W. G. Van Vleck.

**Great Western.**—James H. Bacon, Witchee Jones, O. W. Powers, H. M. Bacon, F. L. Holland, E. F. Colburn, and M. J. Gray, of Salt Lake City, have filed articles of incorporation in Utah for this company.

**Green Bay, Winona & St. Paul.**—S. W. Champion, Superintendent and Purchasing Agent, has been appointed General Manager of the road, with office at Green Bay, Wis.

**Houston Belt & Magnolia Park.**—The annual meeting of the company was held at Houston, Tex., July 4, and the following Directors were elected: T. D. Cobbs, J. Waldo, William Brady, T. W. House, S. K. Dick, R. B. Morris and C. H. Milby. The Directors elected the following officers: J. Waldo, President; T. D. Cobbs, Vice-President; S. B. Strong, Secretary, and R. B. Morris, Treasurer.

**Lake Shore & Michigan Southern.**—C. A. Carpenter has been appointed Engineer of the Lake Shore division in place of E. Handy, who has been made Chief Engineer, vice G. H. Kimball, resigned.

**Litchfield Belt.**—The incorporators and first Board of Directors are: J. B. W. Amsden, H. H. Beach, David Davis and Delos Van Dusen, Litchfield, Ill., and L. C. Haynes, St. Louis.

**Long Island.**—The incorporators of this company, recently chartered in Maine, elected the following officers and directors: President, Herbert G. Briggs, and Treasurer, George F. Gould. Directors: Herbert G. Briggs, George F. Gould, Edward P. Chase, Richard K. Gaffey and Benjamin W. Storey.

**Long Island.**—The office of Master Mechanic has been abolished, and C. A. Thompson, who has held that office, has been promoted to be Superintendent of Motive Power.

**Macon & Northern.**—Capt. W. H. Green, of the Richmond & Danville, has been appointed General Manager of this line.

**Mapleton & Rocky Ridge.**—The company has been incorporated in Pennsylvania by Aaron Upjohn and William B. Blair, Pittsburgh; John O. Phillips and Clifton W. Phillips, Allegheny City. C. W. Phillips is President.

**Mexican Gulf, Pacific & Puget Sound.**—At a recent meeting at Pensacola, Fla., a new Board of Directors was elected as follows: C. H. Dishman, Frank Porterfield, J. N. Brooks, J. J. Duffin, Memphis, Tenn.; John Egan, H. McLoughlin, St. Louis, and S. N. Van Praag. The directors then elected officers as follows: C. H. Dishman, Nashville, Tenn., President; Frank Porterfield, Nashville, Treasurer; S. N. Van Praag, Pensacola, Fla., Secretary.

**Missouri, Kansas & Texas.**—Joel F. Freeman has resigned the Chairmanship of the Board of Directors on account of ill health, but will continue to be a director. H. C. House, formerly of Cleveland, has been elected Chairman of the Board, and William Dowd First Vice-President. H. C. Cross is President and General Manager.

**Mobile & Girard.**—The annual meeting of the stockholders was held at Girard, Ala., last week. The following officers and directors were elected: President, N. P. Banks; Directors, W. H. Brannon, John Peabody, J. D. Murphy, G. M. Williams, J. B. Tarver, Columbus, Ga., and C. H. Franklin, Union Springs, Ala.

**Monson.**—At the adjourned annual meeting of the company the following Directors were elected: H. A. Whiting, J. F. Kimball, C. H. Latham, J. S. Sprague, A. W. Chapin, W. L. Esterbrook, T. P. Elliot, H. A. Whiting, President; J. F. Kimball, Treasurer and General Manager; J. F. Sprague, Clerk and Attorney.

**Norfolk & Southern.**—G. R. Joughins, who about a year ago became Master Mechanic of the road, has lately been made Superintendent of Motive Power.

**Portland & Rumford Falls.**—This company having leased and taken possession of the Rumford Falls & Buckfield road, will hereafter operate the same. The officers are: Hugh J. Chisholm, President; L. L. Lincoln, Superintendent; R. C. Bradford, Treasurer.

**Pueblo & Duluth.**—The following are now the officers of this company: D. Hitchcock, President; James Hunter, Vice-President; A. Wynant, Treasurer; Thomas Marwood, Secretary. The directors are: James Hunter, W. A. Wynant, Ralph A. Weill, W. H. Copcutt, R. W. Carman, New York City; D. Hitchcock, G. E. Miller, Thomas Marwood, Clearwater, Neb.; J. M. Coleman, O. A. Williams, Neligh, Neb.

**Richmond & Chesapeake.**—The annual meeting of the stockholders of the company was held at Richmond, Va., July 6. A reorganization was effected by the election of E. N. Reed, of New York, as President; Charles E. Belvin, of Richmond, Vice-President.

**Richmond & Danville.**—Stephen T. Garland has been appointed General Western Agent of the Georgia Pacific Division, vice Capt. W. B. Russell, resigned.

**Richmond & Rocky Comfort.**—The incorporators of this Texas line are: M. A. Locke, E. L. Hamilton, J. C. Head, A. R. Morris and J. L. Deloney.

**St. Paul, Stillwater & Taylor's Falls.**—C. B. Brunson, Superintendent of the St. Paul Union Depot Co., has been appointed Receiver of this road.

**Savannah, Florida & Western.**—F. B. Papy, formerly Assistant Traffic Manager, has been appointed General Freight Agent, succeeding W. P. Hardee, resigned. The supply department of the company will hereafter be in charge of the superintendent's office. C. O. Haines, Purchasing Agent, has tendered his resignation.

**Skowhegan & Norridgewock.** The company completed its organization at a meeting held at Skowhegan, Me., when R. B. Shepherd, E. P. Page, W. H. Wilder, L. W. Weston, A. E. Bixby, Omar Clark and B. P. J. Weston were elected Directors, and R. B. Shepherd, President; J. I. Smith, Clerk, and A. H. Weston, Treasurer.

**Toledo, Columbus & Cincinnati.**—H. C. Ferris has been appointed Superintendent and Engineer of Maintenance of Way, with office at Kenton, O.

**Toledo & Ohio Central.**—H. A. Cooper has been appointed Purchasing Agent for the Toledo & Ohio Central, the Toledo, Columbus & Cincinnati and the Kana wha & Michigan roads with office at Toledo, O., vice C. A. Carlisle, resigned.

**Toledo & Ohio Central Extension.**—J. V. Parker, formerly Division, Freight and Passenger Agent of the Union Pacific at Salt Lake City, has been appointed Superintendent and Traffic Manager of the road, with office at Marietta, O., in place of W. M. Morse, Superintendent, and H. C. Vincent, General Freight and Passenger Agent, resigned.

**Utah Central.**—T. J. Mackintosh will act as General Superintendent in addition to his other duties as General Ticket and Passenger Agent. He succeeds J. H. Young as General Superintendent.

**Western & Atlantic.**—C. S. Evans, who has been Trainmaster of this road since the Nashville, Chattanooga & St. Louis road lease began, has been appointed Assistant Superintendent of the road.

**West Virginia, Pineville & Tennessee.**—At a recent meeting of the stockholders, S. C. Barnett, J. C. Howard, M. E. Nux and J. B. Butin, all of Minneapolis, were elected directors to succeed W. B. Haldeman, Theodore Harris, J. B. Carson and Elihu Root, of Louisville, resigned.

**Winchester & Strasburgh.**—The annual meeting of the stockholders of the company was held last week. The directors and officers of the road were re-elected as follows: President, Charles F. Mayer; Secretary and Treasurer, William H. Hams; Directors, Robert Garrett, Hugh Sisson, J. B. Stafford, Baltimore; George A. Hupp, Strasburgh, Va., and James B. Russell, Winchester, Va.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Akron & Chicago Junction.**—Ryan & McDonald, the contractors for the line, report that the road is completed and ballasted from Warwick to Chicago Junction, 60 miles. It only remains to complete some sidings and to build stations before this section will be turned over to the Baltimore & Ohio. The transfer is expected to be made by July 15. The work on the remaining section of the line is being rapidly pushed.

**Arbuckle Creek & New River.**—The company has been chartered in West Virginia by J. W. St. Clair, J. H. Gaines and L. G. Gaines, of Fayetteville; W. D. Thurmond and G. W. Jones, of Oak Hill. The capital stock is \$150,000.

**Austin & Northwestern.**—The standard gauging of this road between Austin and Marble Falls, 70 miles, soon to be commenced, will be carried out by the Houston & Texas Central, under whose control the line has recently passed.

**Bangor & Aroostook.**—A second surveying party has been sent out on the proposed route of the road, and the first party is about to begin the final location of the section of the line above Brownville, Me., on which a preliminary survey has already been made.

**Beech Creek.**—A telegram received from Phillipsburgh, Pa., says it has been decided to extend the road from Keermoor to Marks' Mills, in Cambria County, Pa., the line being via Hoyt's to the Susquehanna River, thence up the creek to the destination. Many statements have been published in reference to extensions of this road, but never verified.

**Bennettsville & Hamlet.**—The company has been organized with A. A. Howlett, President; M. L. Dolby, Vice-President, and J. K. Livingston, Secretary, to build a road from Bennettsville to Hamlet, N. C., a distance of 21 miles. G. W. Earle, of Bennettsville, has made a survey of the proposed route.

**Boston & Maine.**—Surveys are being made for several cut-offs to be built by this road under an agreement with the Canadian Pacific, by which a shorter Boston and Montreal route is to be secured. It is estimated that a saving of about 20 miles between the two towns and large advantages in grades and curves will be effected by the plan agreed upon. The Canadian Pacific will build from St. Constant, Que., to Rouse's Point, N. Y., and to Swanton, Vt. From Hardwick, Vt., the Boston & Maine will build a line southeast to Barnet about 15 miles, and again from Fairlee they will build across on to the Northern road at Canaan, N. H. These cut-offs will be easy of construction, excepting that from Hardwick to Barnet. The surveys are already well advanced, and estimates of the cost of construction made. The work on the new lines will be commenced at an early date. The new construction to be done by the Boston & Maine will be only about 27 miles. Hardwick is on the St. Johnsbury & Lake Champlain, and Barnet on the Wells River and the Passumpsic division of the Boston & Maine, as is also Fairlee. Canaan is on the Concordia division. It is understood that the section of

the St. Johnsbury & Lake Champlain from Swanton to Hardwick, to be utilized in the new short line, is to be largely improved and relaid with heavy rails.

The second track on the eastern division between Ipswich and Rowley, Mass., 31 miles, will be placed in operation in a few days. This completes the second track on 31 miles of the eastern division out of Boston. The second track is now being built between Kowley & Newburyport, 6 miles, but this section will not be out of the hands of the contractors before next fall. The double tracking has been completed on the short section between Newburyport and Salisbury. In New Hampshire the line between Exeter and South Newmarket is to be relocated and some of the curves eliminated, and a new double-track line built.

**Brooklyn Union (Elevated).**—The work of constructing the projected branches of this elevated road will probably be commenced shortly. There has been difficulty in securing the right of way, but last week the General Term of the State Supreme Court confirmed the report of the commission appointed to determine whether the three lines which the company proposes to build ought to be constructed. The roads will be built under the charter of the Brooklyn Bridge & Seaside. The routes which the court declares ought to be constructed are those beginning at Fifth avenue, near Thirty-ninth street, and ending at Third avenue and the city line; the second beginning at the tracks at Adams, near Nassau street, to High street to a point near Fulton street, with a connection at the Bridge, and the third route beginning at the intersection of Fulton and Enfield streets, at the city line, to the Jamaica plank road, through to Crescent avenue and thence to the structure of the Brooklyn "L" road in Fulton street. An alternative route is offered beginning at Fulton street and Crescent avenue, and passing through Cypress avenue to the entrance of the Cypress Hills Cemetery.

**Buffalo & Geneva.**—Brodhead & Hickey, of Easton, Pa., contractors on the line through Monroe County between Le Roy and Rush, have begun laying rails. Several miles of road west of Caledonia, N. Y., near the middle of the contract, are ready for the rails.

**Canadian Pacific.**—Under the recent agreement which is to secure a more direct line between Montreal and Boston, recently concluded with the Boston & Maine, and further explained under that title, this company is to construct a line from St. Constant, Que., to Rouse's Point, N. Y., where connection will be made with the Delaware & Hudson Canal Co., and a direct line to New York secured. The company is also to build across the head of Lake Champlain, on the old roadbed that the Central Vermont abandoned some years ago, to Swanton, Vt., where connection with the St. Johnsbury & Lake Champlain road will be made.

**Canadian Railroads.**—The Railway Committee of the Dominion House of Commons has recently taken action upon a number of railroad bills. They have adopted the following bills: To incorporate the Collingwood & Bay of Quintes; the Atikokan Iron Range, with an amendment restricting mining lands which the company may hold to 15,000 acres; the Buffalo Lake & Battleford Coal & Iron Railway Co.; the Victoria, Saanish & New Westminster; the new Baries Chaleurs; the Brighton, Warkworth, Norwood; the Kingston & Pontiac, and the Peterborough, Sudbury & Sault Ste. Marie. Also bills to amend the charters of the Montreal & Ottawa, the Southwestern, the Ontario & Rainy River, the Lake Erie & Detroit River, the Cobourg, Northumberland & Pacific, the South Ontario Pacific, the Berlin & Canadian Pacific Junction. Other bills approved were to confirm the lease to the Canadian Pacific of the Guelph Junction, the New Brunswick road, and the Shuswap & Okanagan, to amend the Canadian Pacific Railroad act: to incorporate the Toronto, Hamilton & Buffalo, amended to protect the present local creditors, and to incorporate the British Columbia Southern, amended so that the Canadian Pacific will not be prejudiced in its claim to prior right of way through Crow's Nest Pass for a year, and a bill confirming the consolidation of the Ottawa & Parry Sound and Ottawa, Amprior & Renfrew roads, and a bill to revive the charter of the Quebec Bridge Co.

**Chesapeake & Ohio.**—Gooch, Rinehart, Carpenter & Co., who had the contract for building the Warm Springs branch, have completed all their work. The branch extends from near Covington north to Warm Springs. The contractors began work in February with nearly 1,000 men. The route is mountainous and the weather has been unpropitious, but the only long delay was in receiving the rails from the railroad. The branch will be opened early in August.

**Chicago & Eastern Illinois.**—Last week tracklaying was commenced at Sullivan, Ill., on the St. Louis extension of this road, which leaves the main line at that point. The grading has been finished for a number of miles beyond Sullivan. Work on the 2,000-ft. bridge at that place is under way. The line runs via Danville, Tuscola and Shelbyville, and will be somewhat longer than the Wabash, the Chicago & Alton, and other Chicago and St. Louis lines.

**Cincinnati, Hamilton & Dayton.**—The narrow-gauge division of the Cincinnati, Dayton & Chicago now operated by this road, between Dayton and Delphos, O., a distance of 96 miles, is being prepared for standard gauge track and it is expected that the rails will be laid about July 15.

**Cincinnati & Kentucky Southern.**—This company recently organized in Kentucky, proposes to purchase the Cincinnati & Green River, a line extending from Kings Mountain to Yosemite, Ky., 13 miles. It is proposed to extend the line from Yosemite through Casey County. A survey has been made for this extension for a distance of about 16 miles west of Yosemite, and it is expected that this part of the line will be built in the fall. Construction work will probably not be commenced until some time in the summer, as the arrangements for building the line have not yet been completed.

**Cleveland, Wooster & Western.**—The rails are now being laid by the contractors south of Lodi to Wooster, O., and they expect to complete the 20 miles between these points before September. The line is being built by Ryan & McDonald, of Baltimore, and is a branch of Akron & Chicago Junction.

**Duluth Transfer.**—The company placed on record this week a trust deed for \$2,000,000, given to the Metropolitan Trust Co., of New York. This mortgage is for moneys to be advanced to the railroad company for the proposed extensions of its terminal railroad on Duluth and St. Louis bays, to build boats and wharves, and furnish terminal facilities to roads entering Duluth.



**Florida, Georgia & Western.**—The Interstate Land & Construction Co., of Florida, recently chartered by J. C. Daves, W. P. Denham and George Lewis, has the contract to build the entire line and branches of this road which is to extend from Tallahassee to Charlotte Harbor, Fla. The work is in progress from Tallahassee, and about 12 miles has already been graded, and a force of 400 men is pushing the work.

**Grafton & Greenbrier.**—Blue Sulphur and Meadow Springs districts, Greenbrier County, W. Va., last week voted to issue bonds to the amount of \$19,000 to be subscribed to the stock of this company. The money is to be used in changing the gauge to standard, and making improvements, and to extend it toward Belington, W. Va.

**Great Northern.**—The end of the track at the Pacific extension has reached the crossing of Two Medicine Creek, Missoula County, Mont., where a bridge between 700 and 800 ft. long and 210 ft. high is to be constructed. It will possibly be two months before the track is laid over the completed bridge. This bridge is 30 miles northwest of the Blackfoot and Piegian agency and 13 miles from the summit of the Rocky Mountains. A large number of men who have been working on grading west of the mountains have been transferred to the sections from Two Medicine Creek, west.

**Great Western.**—A charter for this company was recently filed in Utah by J. H. Bacon, of Salt Lake City, and other directors of the Salt Lake, Wyoming & California, to build a road from Salt Lake City west to the Nevada State line, with a branch to Dugway and Fish Springs. The line proposed is 200 miles long. The articles of incorporation of this company are filed to renew any franchises of the Salt Lake, Wyoming & California that might have lapsed. There is little prospect of the road being built. Mr. Bacon, the President, recently went to New York City to endeavor to secure funds for building the line, but he was unsuccessful.

**Harman, Parsons & Rowlesburg.**—A new survey is said to be in progress for this road between Rowlesburg and Harman, Randolph County, W. Va. The survey is under charge of J. E. Neal, and is being run north from Harman.

**Hazleton Passenger.**—This company has been recently formed in Hazleton, Pa., to build a connecting track between the Philadelphia & Reading and the Delaware, Susquehanna & Schuylkill. The road will start about the center of the town and extend in both directions to West Hazleton, about a mile away, and south to meet the Delaware, Susquehanna & Schuylkill. The capital stock is \$250,000.

**Huntington & Big Sandy.**—This line, which is an extension of the Ohio River road from Huntington, W. Va., to the south, is nearing completion, and will be ready for trains in a few weeks more. The tracklaying is completed as far as Ceredo, Wayne County, and trains will be put on that part of the road in a few days.

**Litchfield Belt.**—Articles of incorporation have been filed in Illinois by this company to build a road through Montgomery County, connecting with the Cleveland, Cincinnati, Chicago & St. Louis and passing through South Litchfield, thence rejoining the road. The capital stock is \$40,000.

**Long Island.**—The company has applied to the Common Council of Brooklyn, N. Y., for permission to construct an elevated road from a point on Atlantic avenue, near Vanderbilt avenue, to the Flatbush avenue station of the road. It is proposed to build a two-track elevated structure, at a cost of \$250,000, to be used by all passenger trains. There are over 300 trains daily in and out of this station. The elevation of the tracks at the terminal will be 22 ft. above the surface of the street. The present double track on the surface of the street will be used only by freight trains, of which there are less than a dozen a day. It is expected that the railroad company will erect a two-story station at Flatbush and Atlantic avenues, using the ground floor for freight and the second story for passenger traffic. The Atlantic Avenue Elevated Road was incorporated last year to build this line.

**Macon & Atlantic.**—McTighe & Co., the Memphis contractors, who have the contract for building the Macon & Atlantic and the Macon & Birmingham roads, are preparing to resume work on the former line at once. The receiver will probably be discharged in a few days, and the contractors will then resume the grading with a large force of men. McTighe & Co. have taken \$100,000 of the road's bonds, and the subcontractors smaller amounts, probably in payment of grading already done. The Lackawanna Iron Co. has taken \$200,000 of the company's bonds, and will furnish the rails. The Macon Construction Co., which is building the road, reports that it has secured \$1,000,000 on collateral. The Macon & Dublin road has built a line between those two points 55 miles, and an arrangement will probably be made by which road will be operated in connection with this line. The distance from Dublin to the connection with the South Bound road, about 25 miles east of Savannah, is about 90 miles, of which 15 miles has been completed from Bruton east. There is six miles to be built between Dublin and Bruton and a balance of 75 miles from the latter point to the South Bound. This makes a total distance of 165 miles between Macon and Savannah. This would be 17 miles shorter than that of the Central of Georgia line which is 192 miles long.

**Maine Shore Line.**—The Directors at a meeting on Thursday last voted that President Leavitt and Directors L. G. Downes and A. McNichol constitute a committee to make a contract with J. D. and R. B. Greene for the construction of the road. It is expected that a considerable part of the road will be built this year.

**Mapleton & Rocky Ridge.**—The company was incorporated in Pennsylvania, June 31, to build a road commencing near Mapleton station, in Huntingdon County, Pa., on the Pennsylvania road, and running in a south-western direction, following Hares Valley a distance of one mile. The capital stock is \$10,000. Clifton W. Phillips, Allegheny City, is President.

**Minneapolis, St. Paul & Sault Ste. Marie.**—Most of the grading on the line from Hankinson northwest to Valley City, N. Dak., which remained uncompleted when grading was abandoned last fall, has been completed since spring. The distance is about 80 miles, and will be entirely graded by July 15. As far as known no arrangements have been made for laying the track on this extension.

**Nashville & Knoxville.**—The contract for the grading on the extension from Cookeville east to Standing Stone in Putnam County, Tenn., is understood to have been let last week. The line put under contract is

about 10 miles long and will bring the road to the top of Cumberland Mountain. There are extensive coal fields in Fentress County, about eight miles from Standing Stone, and it is expected that the road will be completed to that point this year.

**New Orleans & Northwestern.**—Work will soon begin, it is reported, on the proposed extension north of Rayville, La., the present terminus. Several surveys have been made for the line and it is stated that the company has decided to build on the route to Collins on the Houston, Central Arkansas & Northern, a distance of about 15 miles. Connection will be made with the St. Louis over that line and the St. Louis, Iron Mountain & Southern.

**New Roads.**—A survey was begun last week from near Hendricks, Tucker County, W. Va., for a road to extend from that point north along Cheat River to Rowlesburg, on the Baltimore & Ohio, a distance of about 60 miles. The survey is said to be in the interest of the West Virginia Central & Pittsburgh.

Grading was begun near Pioche, Nev., recently for a short mining road which it is proposed to build from that point to the Jackrabbit mines. John Everill, of Salt Lake City, has the contract for grading all the road but five miles out from Jackrabbit, which is let to A. F. Gregerson.

Subsidies are being secured for a road projected to extend from Rutherfordton south to Spartanburg, N. C., a distance of about 31 miles. About \$75,000 has been subscribed at Spartanburg.

**Norfolk & Western.**—The survey for the connection of the Shenandoah Valley division with the Virginia Midland at Front Royal, Va., has been completed, and the building of the necessary mile of new road will soon be commenced and speedily finished. The impression is that the Norfolk & Western will make its connection with Washington by the Virginia Midland via Alexandria.

**Norfolk, Wilmington & Charleston.**—An engineer corps will commence this week and start from Gilmer, Va., on the Dismal Swamp canal, to survey the route of the road through North Carolina. Several engineer parties are at work on the road.

**North Chicago.**—A charter has been obtained in Illinois by this corporation, formed for the building of an elevated road from Chicago, north, to Evanston, 12 miles, provided the necessary franchises are granted by the city of Chicago. There are no indications that the new project will fare any better than its predecessors. The incorporators are Eastern men.

**Northern Pacific.**—The track on the Yakima & South Coast line has been completed for about 10 miles from Chehalis, Wash., on the main line, the eastern terminus. Four bridges have been built on this section, two across the Chehalis River.

**North Georgia.**—A survey is being made near Clayton, Ga., for this line which is to extend from Franklin, N. C., to Anderson, S. C., a distance of about 80 miles. The surveys for that portion of the line in South Carolina, from Anderson northwest toward Clayton, have just been completed.

**Orlando & Oakland.**—The contractors have the grading completed on or about half of the 15 miles of this road which is being built west from Oakland to Orlando, connecting the Orange Belt with the South Florida road.

**Pacific Short Line.**—A. S. Garretson, of Sioux City, Ia., who is one of the heaviest local stockholders of this road, is reported as saying that when the foreclosure sale is held the line will be purchased for the Chicago, Burlington & Quincy, the intention being to extend it from O'Neill southwest about 80 miles to Dunning, Neb., on one of the Burlington's line to Wyoming.

**Philadelphia Northeastern Elevated.**—At a meeting of the directors held at the office, Fourth and Chestnut streets, Philadelphia, this week, Edward Lauterbach, of New York, Andrew Onderdonk and Samuel R. Shipley were appointed a committee to receive proposals for building the elevated line. Frederick B. Esler, of Philadelphia, is President.

**Pickens, Arvon & Western.**—This line is now said to be under construction between Arvon and Pickens, W. Va., the proposed terminal points. It is a narrow gauge line recently incorporated. The West Virginia & Pittsburgh is building a nine-mile branch from Newton to connect with it at Pickens.

**Richmond & Chesapeake.**—A reorganization of the company was effected at a meeting at Richmond, Va., July 6. E. N. Reed, of New York, was elected President, Charles E. Belvin of Richmond, Vice-President, and a directory composed of New York and Richmond stockholders. It was stated that the company has issued \$4,500,000 in bonds to build the road from Richmond to Wicomico, or some point near there on Chesapeake Bay. It was also stated that work on the tunnel under Richmond will be resumed at once.

**Richmond & Rocky Comfort.**—The company was incorporated in Texas with a capital stock of \$42,000. The road will extend from Kellar, on the Texarkana & Fort Smith Road, to Richmond, and thence to Rocky Comfort, a distance of 20 miles. The incorporators are: M. A. Locke, E. L. Hamilton, J. C. Head, A. R. Morris and J. L. Deloney.

**Roanoke & Southern.**—The contractors have completed the grading on the section south of Roanoke, Va., as far as the Staunton River, and tracklaying will soon begin. C. R. Morgan, who had the contract on the first eight miles, completed his work last week. The bridge which is to span the Roanoke River is in course of construction at the American Bridge & Iron Works, and it is expected to have the track laid to the river by the time the bridge is completed.

**Salt Lake, Colorado & Gulf.**—The surveying has been completed for this road, and one of the directors states that it is proposed to begin the construction of the line in October. The line starts from Cortez, La Plata County, Col., extends south, through the Montezuma Valley, across the Navajo reservation, the famous Carizo Mountain mining district, then through the coal fields of Gallup, New Mexico, to Fort Wingate. Connections are made with the Atlantic & Pacific at that point. The distance is about 130 miles. J. R. Hanna, of Cortez, is a director.

**San Joaquin Valley.**—A contract has been let to Fitzgerald Bros., of San Francisco, for the construction of 25 miles, or the first section, of this road, locally known as the Mountain Railroad, which is to extend from Fresno, Cal., to the timber and mineral belts in the eastern portion of Fresno County. The total length

of the proposed lines, with branches, is about 100 miles. The first section of the road is to be completed by Sept. 15.

**Seattle & Montana.**—The track is now laid to Mukilteo, Wash., about 25 miles north of Seattle. Mukilteo is on a promontory some miles south of Marysville where the line leaves the coast of Puget Sound, which it follows from Seattle, and extends inland to the connection with the Fairhaven & Southern. The company expects to use the terminal facilities of the Northern Pacific and Seattle Terminal in Seattle. The road will probably be completed to Fairhaven by Aug. 15, after which date the Canadian Pacific will run its trains through to Seattle over the Great Northern branches, since an agreement with the Northern Pacific to run in over the Seattle, Lake Shore & Eastern seems to be out of the question. The trestle along the Seattle water front will not be completed until the rails have been laid on the balance of the road. The terminal yards and station site will be filled in. The latter work will cost \$500,000.

**Snohomish, Skykomish & Skokane.**—The arrangements are said to have been completed for building this line from Snohomish to Port Gardner on Puget Sound a few miles north of Fairhaven, Wash. The distance will be about 10 miles and the Northern Pacific will, it is understood, assist in building the line. The road is to reach the Silver Creek mines east of Port Gardner.

**Southern Pacific.**—Tracklaying has begun on the new line at the Pecos River, which is to extend from near Comstock to near Shumla, Tex., 13 miles. Ricker, Lee & Co., of Galveston, are the contractors. The bridge is being erected and the work is making steady progress. The bridge will have 22 piers 30 ft. wide, the centre one being 314½ ft. from the surface of the water (10 ft. deep) to the base rail. There will also be 12 spans 35 ft. long, nine spans 65 ft. long, two 80 ft. long, and one 175 ft. long, a total of 1,320 ft.

The road at Seven Palms, Cal., just on the southern edge of the Colorado Desert, will be moved three miles nearer to the mountains in order to avoid the shifting sand that frequently buries the track for miles.

**Texas, Louisiana & Eastern.**—The contract has been let to T. C. Clay for the construction of 10 miles of road from Conroe, Tex., in an easterly direction toward Trinity River. The road is to be standard gauge, and will make connection with the Gulf, Colorado & Santa Fe, and the International & Great Northern, at Conroe. The new line is to be extended from the present proposed terminus to the Trinity River.

**Toledo & Chicago Bee Line.**—The Toledo & Western projected line from Toledo, O., west to Chicago, has been rechristened by the projector of the Pacific Short Line, who has now an interest in the project. Said Mr. Donald McLean to a reporter: "Building will begin at once, and before 1892 arrives the trains will be running over the line. Everything is ready. All money necessary is secured, and the contracts will be let at once." Last fall the projectors secured a number of subsidies from the local towns, but when the Lake Shore & Michigan had a company chartered to build over the same route and asked for subsidies also, the project was suddenly dropped.

**Toledo & South Haven.**—The report of the sale of this road to the Chicago & West Michigan is said to be confirmed. The road is narrow gauge, extending from South Haven east to Lawton, Mich., 37 miles. An extension is proposed from Paw Paw, north of Lawton, northeast to Kalamazoo, about 20 miles.

**Tuckahoe & Cape May.**—A change of route is said to be contemplated, which will deviate the line as now located through the interior of Cape May County, N. J., to the towns along the Atlantic coast. It is this done the line south of Sea Isle City will reach Avalon, Angelsea, Holly Beach and Wildwood. The Cape May line as at present surveyed and graded branches off from the Philadelphia & Sea Shore at Tuckahoe. It extends across the country to Dennisville, half way between the ocean and Delaware Bay, and then over to Cape May Court House. From there it parallels the West Jersey road in to Cape May. This somewhat roundabout way was selected with a view of inducing farmers and towns along the route to subscribe to the stock. If the coast route is finally adopted, the road will connect with the Philadelphia & Sea Shore at Sea Isle City, instead of at Tuckahoe. It would be necessary to bridge Townsend's, Hereford and Turtle Gut Inlets. The beach route would be shorter than the other, but would cost more, owing to the large amount of bridging. The preliminary legal arrangements for consolidating the Philadelphia & Sea Shore and Tuckahoe and Cape May companies have been made.

**Wadena & Park Rapids.**—The grading on the line north from Wadena to Park Rapids, Minn., 36 miles, has been delayed, and has not yet been completed as expected. The contractors have recently resumed work with renewed activity, and are working night and day to complete the road by Aug. 1. An extension is also to be built from Wadena south to Eagle Bend, 19 miles.

#### GENERAL RAILROAD NEWS.

**Canadian Pacific.**—The earnings and expenses of the company for May are given in the following table:

Month of May:	1891.	1890.	Inc.
Gross earnings	\$1,602,919	\$1,319,422	\$283,497
Operating expenses	1,012,221	854,720	158,501
Net earnings	\$590,698	\$464,702	\$125,996
Since Jan. 1:			
Gross earnings	\$7,424,982	\$5,854,745	\$1,570,237
Operating expenses	5,072,273	4,122,249	950,024
Net earnings	\$2,352,709	\$1,671,906	\$680,803

**Central of New Jersey.**—The statement of operations of the road for May and five months since Jan. 1 is thus reported:

May:	1891.	1890.	Inc. or Dec.
Gross earnings	\$1,148,050	\$1,163,821	D. \$15,771
Operating expenses	656,210	607,106	D. 10,956
Net earnings	\$491,840	\$556,715	D. \$64,875
Jan. 1 to May 1:			
Gross earnings	\$5,254,825	\$4,865,814	I. \$389,011
Operating expenses	3,127,488	3,017,131	I. 110,555
Net earnings	\$2,127,337	\$1,848,683	I. \$278,654

**Boston, Revere Beach & Lynn.**—The stockholders of the road at a special meeting held in Boston, July 8, voted to consolidate with the Boston, Winthrop & Shore road. The number of votes cast was 4,947, of which but six were against the proposition. The terms upon which



the directors have agreed will be published when ratified by the stockholders of the Boston, Winthrop & Shore Railroad at the meeting to be held this week.

**Atchison, Topeka & Santa Fe.**—The gross earnings, operating expenses (exclusive of taxes and rentals), and net earnings of the road and its auxiliary lines for May were as follows:

	Gross earn.	Oper. expen.	Net earn.	Oper. mlg.
Roads owned and controlled.....	\$2,803,901	\$1,739,861	\$1,064,040	6,527
Roads jointly owned.....				
Atchison Co.'s one-half.....	149,281	146,669	2,612	587
Total Atchison system.....	\$2,953,182	\$1,886,530	\$1,066,652	7,114
<b>St. Louis &amp; San Francisco:</b>				
Roads owned and controlled.....	\$519,631	\$306,433	\$213,198	1,327
Roads jointly owned with Atchison, Frisco Co.'s one-half.....	146,332	141,230	5,102	536
Total Frisco system.....	\$665,963	\$447,663	\$218,300	1,863
Aggregate, both systems.....	\$3,619,145	\$2,334,193	\$1,284,952	8,977

The comparative statement of all lines is as follows:

	Gross earn.	Net earn.	Per Mile. Gross earn.	Per Mile. Net earn.	Mile- age.
<b>Atchison System:</b>					
May, 1891.....	\$2,953,182	\$1,066,653	\$115.10	\$149.93	7,114
May, 1890.....	3,005,718	895,419	122.73	125.93	7,110
Inc. or dec.....	D. \$52,535	I. \$171,234	D. \$7.63	I. \$24.00	I. 4
<b>St. Louis &amp; San Francisco:</b>					
May, 1891.....	\$665,963	\$218,300	\$357.53	\$117.20	1,863
May, 1890.....	695,684	246,076	374.96	132.63	1,855
Inc. or dec.....	D. \$29,721	D. \$27,776	D. \$17.43	D. \$15.43	I. 8
<b>Aggregated General System:</b>					
May, 1891.....	\$3,619,145	\$1,284,952	\$403.15	\$143.14	8,977
May, 1890.....	3,701,402	1,141,495	412.84	127.31	8,935
Inc. or dec.....	D. \$82,257	I. \$143,457	D. \$9.69	I. \$15.83	I. 12

**Chicago Junction Railways & Union Stockyards.**—The annual financial statement of the company published last week shows the net revenue for the year to be \$1,687,000; surplus after six per cent. dividend on the preferred and 10 per cent. on the common, \$60,650. Of the \$13,000,000 capital stock authorized, \$12,441,900 has been issued. The amount of cash on hand is \$785,354, and semi-annual dividends on both the preferred and common stock will be paid next week.

**Cincinnati, Jackson & Mackinaw.**—The Central Trust Co. of New York has applied to the United States Circuit Court at Toledo, O., for a decree ordering the sale of this road at foreclosure. The sale will occur about Sept. 15. The road will be sold first in two divisions, the Central Division from Cecil, in Paulding County, to Greenville, in Darke County, O., the remainder from Greenville to Franklin County, O. The second division from Cecil to Allegan, Mich., and from Addison Junction to Dundee, Mich.

**Cleveland, Cincinnati, Chicago & St. Louis.**—The railroad makes the following report of operations for May and the 11 months of the fiscal year:

	1891.	1890.	Inc. or Dec.
<b>Month of May:</b>			
Gross earnings.....	\$1,026,971	\$1,118,852	D. \$91,881
Operating expenses.....	677,678	671,333	I. 6,345
Net earnings.....	\$349,293	\$447,520	D. \$98,227
Fixed charges.....	204,929	223,725	D. 18,796
Balance.....	\$144,364	\$223,795	D. \$79,431
<b>Since July 1:</b>			
Gross earnings.....	\$12,108,191	\$11,838,052	I. \$270,139
Operating expenses.....	8,159,139	7,661,937	I. 497,202
Net earnings.....	\$3,949,052	\$4,176,115	D. \$227,063
Fixed charges.....	2,727,377	2,835,783	D. 108,406
Balance.....	\$1,221,675	\$1,340,332	D. \$118,657

**Hudson Tunnel Railway Co.**—The company denies that there is likely to be another delay in the work of construction on account of a lack of funds. The company having decided to issue \$2,500,000 of new bonds to retire outstanding mortgage bonds, and several prominent capitalists in this country and Europe being prepared to put a large amount of money into the enterprise, the managers are confident of being able to complete the tunnel within less than two years. There may be considerable litigation before the company can acquire the right of way for the terminals on the New York side and perhaps also on the Jersey side.

**Lake Shore & Michigan Southern.**—The following is the statement of earnings and expenses for the six months ending June 30.

	1891.	1890.	1889.
Gross earnings.....	\$9,502,000	\$9,908,767	\$8,732,454
Operating expenses.....	6,560,634	6,919,280	5,834,324
Net earnings.....	\$2,941,366	\$2,989,487	\$2,918,130
Fixed charges.....	1,680,000	1,680,000	1,755,000
Balance.....	\$1,261,366	\$1,309,487	\$1,163,130
Dividend.....	1,236,662	989,330	989,330
Surplus.....	\$24,734	\$320,157	\$173,800

**Louisville & Nashville.**—At the meeting of the stockholders of the company held in Louisville, Ky., July 6, the proposition to increase the stock of the corporation to \$55,000,000 was ratified, also the purchase of the Kentucky Central road, and the stockholders further agreed to accept the proposition of the additional issue of stock by the Nashville, Chattanooga & St. Louis road, to which the company is entitled.

**Meadville, Conneaut Lake & Linesville.**—The name of the Meadville & Linesville has been changed to the above, and Mr. Edgar Huidekoper elected President. The road was recently purchased in the interest of the Pittsburgh, Shenango & Lake Erie at foreclosure sale, and formal possession has now been taken.

**Michigan Central.**—The following is the statement of earnings for the first six months of the year, the earnings of the Canada Southern being included:

	1891.	1890.	1889.
Gross earnings.....	\$6,565,000	\$6,843,000	\$6,233,000
Operating expen.....	5,135,000	4,968,000	4,424,000
Net earnings.....	\$1,430,000	\$1,875,000	\$1,809,000
Fixed charges.....	1,230,000	1,222,000	1,260,000
Balance.....	\$200,000	\$653,000	\$549,000
1-3 to Canada South.....	157,000	181,000	156,000
2-3 to Michigan Cent.....	443,000	472,000	393,000

After paying the dividend, there is a surplus on Mich-

igan Central of \$68,236, against \$97,236 last year, and Canada Southern shows a deficit of \$30,500 after paying the dividend, against a deficit last year of \$6,500.

**Montreal & Sorel.**—The operation of this road has been suspended, in consequence of the appointment of a sequestrator by the court at Montreal, who will represent the English bondholders. Cars and engines have been attached by the local authorities at Sorel, Que. The road is heavily in debt, and is involved in seemingly hopeless legal complications.

**Northern Pacific.**—The gross earnings for June of this year were \$2,264,008, as compared with \$2,373,121 earned in 1890, a decrease of \$109,113. The mileage operated in 1891 was 4,603 miles, an increase of 566 miles.

**Philadelphia, Wilmington & Baltimore.**—State Treasurer Burnite, of Delaware, has received \$50,000 from this railroad as the first payment for the purchase of the state's mortgage against the Junction & Breakwater and the Breakwater & Frankford railroads.

**Richmond & Danville.**—At a recent meeting of the stockholders in Richmond a resolution was adopted which authorizes the Board of Directors to issue equipment trust bonds for the sum of \$2,000,000, bearing such rate of interest and payable at such time as the Directors may determine, secured by a mortgage upon the equipment thus purchased or other property of the company.

**Southern Pacific.**—The earnings on the Pacific system for May were \$2,983,372 and the operating expenses \$1,735,797. On the Atlantic system for the same period the earnings were \$957,853 and the operating expenses \$752,054. The total earnings of both systems for this month were \$3,941,225, against \$4,156,100 for the same period for the previous year, and the operating expenses \$2,487,851, against \$2,576,772 for May, 1890. Up to May 31 both systems for the year earned \$18,509,551, operating expenses being \$12,362,972. For the same period during the previous year the earnings were \$17,703,169 and the operating expenses \$12,960,221.

**Union Pacific.**—The following is the preliminary statement of the earnings of the system for May:

	1891.	1890.	Inc. or dec.
<b>Month of May:</b>			
Gross earnings.....	\$3,344,233	\$4,043,415	D. \$699,182
Operating expen.....	2,314,812	2,740,228	D. 425,416
Net earnings.....	\$1,029,421	\$1,303,187	D. \$273,766
<b>For five months:</b>			
Gross earnings.....	\$15,468,019	\$16,107,887	D. \$639,868
Operating expen.....	10,828,712	11,726,016	D. 897,304
Net earnings.....	\$4,639,307	\$4,381,871	I. 257,436

The loss in the gross earnings is about 18 per cent., and although the operating expenses have been very much reduced, the falling off is not sufficient to prevent a loss of more than 20 per cent. in net earnings. For the five months of the year expenses have been so cut down that with a reduction of about four per cent. in the gross earnings an increase of about six per cent. has been made possible in net earnings.

**Wisconsin Central.**—The company has issued a circular to the stockholders of the Central Car Co., giving plans for refunding the Car Trust obligations and providing other property, machinery, etc. The Wisconsin Central Co. and Wisconsin Central Railroad will issue joint obligations to secure authorized issue of equipment and improvement sinking-fund bonds to the amount of \$12,000,000 bearing five per cent. interest and payable in 40 years.

## TRAFFIC.

### Chicago Traffic Matters.

CHICAGO, July 8, 1891.

Chairman Finley remains firm in his determination not to recognize the Alton until it shall have purged itself of contempt in the Western Passenger Association. He has discontinued assessing it for a share of the expenses of the association since the 15th of June, and also omits the name of the road and representative from the official issue of excursion circulars issued by the association. At the regular meeting of the association, which adjourned to-night, the Alton was not represented, nor called on the roll call, and no mention was made of its position; and the meeting was quite harmonious. In the absence of Chairman Finley, who is attending the trial of J. M. Egan at St. Paul, General Passenger Agent Eustis, of the Burlington, presided. Action on some matters, such as excursion rates, in which the Alton is particularly interested, was deferred until the special meeting to be held next Tuesday.

The Commissioners of the Western Traffic Association have given notice that they will be in session on July 10 for the hearing of matters that have been appealed and referred to them for decision. There is a large amount of work before them, and the session is likely to be prolonged as long as possible and give the Commissioners time to prepare their reports for the Advisory Board.

President Miller, as President of the Advisory Board of the Western Traffic Association, has issued a call for the quarterly meeting of the association at the Windsor Hotel, New York, July 14. In view of the large number of important subjects which will be presented to the board for action the meeting will be an important one. The appeal of the Atchison from the decision of the commissioners in regard to the differential tariff issued by the former will come up, as well as several reports from the commissioners in regard to action taken since the last meeting upon several matters which were referred to them, notably the plan for establishment of joint agencies.

The Western Freight Association have decided in favor of a literal interpretation of their rule forbidding the payment, by the representatives of any of the lines, of charges for telegrams for the purpose of securing business. The question arose as to whether it would be a violation of the rule to send a telegram to route shipments over a certain line when no mention was made in ordering the goods that would benefit the consignee. Chairman Midgley also decides that the rule of the association forbidding advertisements in trade journals by the freight departments does not prohibit advertisements by the passenger departments, provided such advertisements are restricted to a recital of facilities for passenger travel.

The predictions of a large movement of tonnage are beginning to be verified, and the roads are likely soon to be again confronted with a shortage of available rolling stock.

The trial of John M. Egan, President and General Manager of the Chicago, St. Louis & Kansas City, for alleged violation of the Interstate Commerce law, was

begun in the United States Circuit Court at St. Paul to-day. The specific charge is that Charles H. Holdridge, General Passenger Agent, sold to Charles H. Petsch 5,000 unlimited tickets to Chicago at \$7 each, which is \$4.50 under the regular Chicago-St. Paul rate.

## Traffic Notes.

The United States Grand Jury at Springfield, Ill., last week indicted Milton Knight, Freight Traffic Manager of the Wabash, and J. B. M. Kehlner, a St. Louis shipper, for violation of the interstate commerce law.

The petition of the Interstate Commerce Commission for the enforcement of its order against the Lehigh Valley in the case of Coxie Brothers & Co. will not be heard by the United States Court for several months.

The Central New England & Western announces a general reduction of passenger rates. They have heretofore averaged about 3 cents per mile. The new schedule reduces the rate to 2½ cents per mile, with a system of excursion rates, good for 10 days, at still lower rates.

The Central Traffic Association has agreed to a rate of one fare for the round trip to the National Encampment of the Grand Army of the Republic at Detroit Aug. 3-8. Tickets good going Aug. 1-3 and returning Aug. 8-18, with no stop-over privilege. Return coupons may be extended to allow excursion trips.

The Northern Railroad of France issues passenger tickets made like a sheath, so that a folded sheet of this paper can be inserted. This sheet is covered on both sides with closely printed advertisements of Paris hotels and shops to the number of about 100. The bottom of the ticket is clipped so as to show a tiny portion of the sheet, and to facilitate its being pulled out.

The regulations for the sleeping-car service on the Pennsylvania lines west of Pittsburgh provide for a duplex identification check, one of which is to be pinned to the ticket or pass when lifted by the Pullman representative and the other to be retained by the passenger, who is cautioned to be very careful of it, as it represents his ticket. When cash fare is presented, the train conductor is to be called to receive it.

The joint committee has adopted the recommendation of the Committee of Auditors appointed by the Trunk Line and Central Traffic associations, that the order of columns on waybills be as follows:

First.	Second.	Third.
"Freight."	"Advance."	"Prepaid."

The committee requests all roads to be governed accordingly.

The Interstate Commerce Commission, in an opinion by Commissioner Veazey, has denied the application for rehearing filed by the Pennsylvania in the case of the Boston Fruit and Produce Exchange against that company, the N. Y., N. H. & Hartford, the New York & New England and others. The Commission prescribed the freight rate upon peaches in carload lots from New Jersey and the Delaware peninsula to Boston. The roads east of Harlem River construed the decision as justifying them in insisting that the freight charge should be divided among the carriers on a mileage basis. It is now held that the former decision could not be fairly construed as justifying the claim that the single freight charge between the interstate points should be divided on a mileage basis merely; that many of the considerations which induced the fixing of an increased rate for the special service were peculiar to the Pennsylvania, and in which the other carriers east of the Harlem River did not participate; that under the pleadings and evidence in this case the Commission could only prescribe a through rate to be reasonably and fairly divided among the several carriers by themselves. They ought to be as well able to divide this as other rates.

### East-Bound Shipments from Missouri River Points.

A comparison of statements of east-bound car-load shipments crossing the Missouri River gateways for June, 1890, and June, 1891, shows the following:

	1890.	1891.
Cars.....		
Wheat.....	194	1,259
Corn, rye and oats.....	4,219	1,626
Dressed beef, hogs and mutton.....	1,070	1,857
Cattle.....	3,333	1,510
Hogs and sheep.....	52	340
Other freight.....	1,867	2,036
Total.....	11,207	7,608

The percentages carried by each line were as follows:

	1890.	1891.
P. c.		
Chicago & Alton.....	13.8	12.0
Burlington.....	16.4	13.5
St. Paul.....	8.5	6.8
Rock Island.....	8.9	7.3
Atchison.....	23.4	21.0
Chic., St. Paul & Kansas City.....	11.3	7.4
Wabash.....	6.7	8.5
Missouri Pacific.....	3.7	11.3
Kan. City, Fort Scott & M.....	7.3	12.2
Total.....	100.0	100.0

### East-Bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending June 30 amounted to 31,692 tons, against 43,628 tons during the preceding week, a decrease of 11,936 tons, and against 46,298 tons during the corresponding week of 1890, a decrease of 14,606 tons. The proportions carried by each road were:

	Wk. to June 30		Wk. to June 25.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	2,200	7.0	4,556	10.5
Wabash.....	2,082	6.6	2,507	5.8
Lake Shore & Michigan South.....	4,511	14.2	6,236	14.3
Pitts., Ft. Wayne & Chicago.....	4,349	13.7	5,194	11.9
Pitts., Cin., Chicago & St. L.....	3,676	11.6	5,468	12.5
Baltimore & Ohio.....	2,459	7.7	3,415	7.8
Chicago & Grand Trunk.....	3,037	9.6	3,301	7.6
New York, Chic. & St. Louis.....	3,078	9.7	4,337	9.9
Chicago & Erie.....	6,300	19.9	8,604	19.7
Total.....	31,692	100.0	43,628	100.0

Of the above shipments, 1,478 tons were flour, 9,461 tons grain, 1,653 tons millstuff, 3,468 tons cured meats, 5,083 tons dressed beef, 1,570 tons butter, 1,205 tons hides, and 7,336 tons lumber. The three Vanderbilt lines together carried 30.9 per cent., while the two Pennsylvania lines carried but 25.3.